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# Reference Tables for Thermocouples

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# Reference Tables for Thermocouples

Henry Shenker, John I. Lauritzen, Jr., Robert J. Corruccini  
and S. T. Lonberger



## National Bureau of Standards Circular 561

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## Preface

One of the important functions of the National Bureau of Standards is to compile scientific and technical data that have broad and useful applications in science and industry. In many cases the programs are carried out in cooperation with scientific and industrial bodies requiring basic and accurate information in a given field. A project of this type that has been in progress at the National Bureau of Standards for several years has involved the preparation and issuance of up-to-date temperature-electromotive-force tables for thermocouples used in science and industry to convert the measured electromotive force of thermocouples into equivalent temperatures, the testing and calibration of commercial thermocouples, the preparation of purchase specifications for thermocouple wire, and in the precise calibration of the scales of instruments in order that temperatures may be read directly.

The present reference tables have been prepared to make available in composite and convenient form the data previously issued in Bureau publications now out of print, and to meet the indicated continuing need in industry and science for the currently accepted values.

A. V. ASTIN, *Director*.

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# Reference Tables for Thermocouples

Henry Shenker,<sup>1</sup> John I. Lauritzen, Jr.,<sup>2</sup> Robert J. Corruccini,  
and S. T. Lonberger<sup>3</sup>

Expanded reference tables for platinum versus platinum-10-percent rhodium, platinum versus platinum-13-percent-rhodium, chromel-alumel, iron-constantan (modified 1913), copper-constantan, and chromel-constantan thermocouples are given with temperature in degrees Celsius (centigrade) and Fahrenheit and electromotive force in millivolts as the arguments. The tables are based upon the absolute electrical units and the International Temperature Scale of 1948.

## Introduction

The temperature-electromotive-force relationship for a thermocouple in general cannot be expressed by a simple equation. It is convenient, therefore, to have empirical tables giving the temperature-electromotive-force relationship for the various types of commercially available thermocouples. For any thermocouple type, a table is based on calibrations of representative thermocouples at sufficient points to yield a temperature-electromotive-force plot characteristic of the material. These tables, therefore, do not represent the temperature-electromotive-force relationship for a particular thermocouple but rather a mean of a number of thermocouples of that type. The reference tables so derived provide a basis for drawing deviation curves for comparing individual thermocouples with others of their type or with instruments calibrated to read temperature directly. By using the reference tables in conjunction with a deviation curve, greater precision may be obtained by using a given number of calibration points than from the use of the calibration data alone. The deviation curve is constructed by plotting the differences between the calibration data of an individual instrument and the reference table. The points so plotted may then be connected by a continuous curve which may be used for interpolating between calibration points. For example, it is desired to determine the temperature of a furnace from the measured electromotive force of a calibrated thermocouple. The electromotive force developed by the thermocouple, however, does not correspond to that of any of the calibration points. By plotting a difference curve from the calibration data, one may interpolate between the calibration points to find the correction to be added algebraically to the measured electromotive force to yield the reference table value. The reference table may now be referred to and the furnace temperature corresponding to the corrected thermocouple electromotive force determined.

Reference tables for the different types of commercial thermocouples have been published at various times by the National Bureau of Standards. The present publication brings together the latest versions of all such tables prepared at the NBS. The numerical values given in these tables are the same as those given in "Reference tables for thermocouples", by Henry Shenker, John I. Lauritzen, Jr., and Robert J. Corruccini, NBS Circular 508 (1951) and "Modified 1913 reference tables for iron-constantan thermocouples", by Robert J. Corruccini, and Henry Shenker, J. Research NBS **50**, 229 (1953) RP2415.

In these tables electromotive force is expressed in absolute units. The change from international to absolute electrical units, which, by international agreement, became effective of January 1, 1948, is described in NBS Circular 459.<sup>4</sup> One absolute volt is equal to 0.99967 international volt (U. S.).

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<sup>3</sup> This revision was prepared by S. T. Lonberger.

<sup>4</sup> NBS Circular 459, Announcement of changes in electrical photometric units, 7 pages (May 15, 1947), available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., price 5 cents.

Temperatures are expressed on the International Temperature Scale of 1948, which is defined in "The International Temperature Scale of 1948", by H. F. Stimson, *J. Research NBS* **42**, 209 (1949) RP1962, and "Differences between the International Temperature Scales of 1948 and 1927", by R. J. Corruccini, *J. Research NBS* **43**, 133 (1949) RP2014.

Certain small apparent inconsistencies will be found in the tables. Differences of this sort result from rounding and, being negligible, have been allowed to stand. For example, in table 1, the temperature 79.9° C (rounded) corresponds to exactly 0.500 millivolt, while from table 3, 0.500 millivolt (rounded) corresponds to exactly 80° C. By reverting to the equation in the original reference by which these values were calculated, one may confirm the correctness of the above values to the number of places given.

The tables for platinum versus platinum-10-percent-rhodium thermocouples are based on formulas in "Reference tables for platinum to platinum-rhodium thermocouples", by Wm. F. Roeser and H. T. Wensel, *BS J. Research* **10**, 275 (1933) RP530. The tables for platinum versus platinum-13-percent rhodium thermocouples are based on tables from the same reference. The tables for chromel-alumel thermocouples are based on "Standard tables for chromel-alumel thermocouples", by Wm. F. Roeser, A. I. Dahl, and G. J. Gowens, *J. Research NBS* **14**, 239 (1935) RP767. The tables for copper-constantan thermocouples are based on "Reference tables for iron-constantan and copper-constantan thermocouples", by Wm. F. Roeser and Andrew I. Dahl, *J. Research NBS* **20**, 337 (1938) RP1080 for temperatures above 0° C (32° F), and on table 1 of "Calibration of thermocouples at low temperatures", by Russell B. Scott, *J. Research NBS* **25**, 459 (1940) RP1339 for temperatures below 0° C. The tables for chromel-constantan thermocouples are based on tables for chromel-platinum given in RP767 and tables for constantan-platinum given in RP1080.



# Part I. Celsius (centigrade) Tables

## Table 1. Platinum Versus Platinum-10-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts | .000  | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| Degrees C  |       |       |       |       |       |       |       |       |       |       |       |            |
| 0.000      | 0.0   | 1.8   | 3.6   | 5.4   | 7.2   | 9.0   | 10.7  | 12.5  | 14.3  | 16.0  | 17.7  | 0.000      |
| .100       | 17.7  | 19.4  | 21.1  | 22.8  | 24.5  | 26.2  | 27.8  | 29.5  | 31.1  | 32.8  | 34.4  | .100       |
| .200       | 34.4  | 36.0  | 37.6  | 39.2  | 40.8  | 42.4  | 44.0  | 45.6  | 47.1  | 48.7  | 50.2  | .200       |
| .300       | 50.2  | 51.8  | 53.3  | 54.8  | 56.4  | 57.9  | 59.4  | 60.9  | 62.4  | 63.9  | 65.4  | .300       |
| .400       | 65.4  | 66.9  | 68.3  | 69.8  | 71.3  | 72.7  | 74.2  | 75.6  | 77.1  | 78.5  | 79.9  | .400       |
| .500       | 79.9  | 81.4  | 82.8  | 84.2  | 85.6  | 87.0  | 88.5  | 89.9  | 91.3  | 92.7  | 94.0  | .500       |
| .600       | 94.0  | 95.4  | 96.8  | 98.2  | 99.6  | 100.9 | 102.3 | 103.7 | 105.0 | 106.4 | 107.7 | .600       |
| .700       | 107.7 | 109.1 | 110.4 | 111.8 | 113.1 | 114.4 | 115.8 | 117.1 | 118.4 | 119.7 | 121.0 | .700       |
| .800       | 121.0 | 122.4 | 123.7 | 125.0 | 126.3 | 127.6 | 128.9 | 130.2 | 131.5 | 132.8 | 134.1 | .800       |
| .900       | 134.1 | 135.3 | 136.6 | 137.9 | 139.2 | 140.5 | 141.7 | 143.0 | 144.3 | 145.5 | 146.8 | .900       |
| 1.000      | 146.8 | 148.1 | 149.3 | 150.6 | 151.8 | 153.1 | 154.3 | 155.6 | 156.8 | 158.1 | 159.3 | 1.000      |
| 1.100      | 159.3 | 160.6 | 161.8 | 163.0 | 164.3 | 165.5 | 166.7 | 167.9 | 169.2 | 170.4 | 171.6 | 1.100      |
| 1.200      | 171.6 | 172.8 | 174.1 | 175.3 | 176.5 | 177.7 | 178.9 | 180.1 | 181.3 | 182.5 | 183.7 | 1.200      |
| 1.300      | 183.7 | 184.9 | 186.1 | 187.3 | 188.5 | 189.7 | 190.9 | 192.1 | 193.3 | 194.5 | 195.7 | 1.300      |
| 1.400      | 195.7 | 196.9 | 198.1 | 199.2 | 200.4 | 201.6 | 202.8 | 204.0 | 205.2 | 206.3 | 207.5 | 1.400      |
| 1.500      | 207.5 | 208.7 | 209.9 | 211.0 | 212.2 | 213.4 | 214.5 | 215.7 | 216.9 | 218.0 | 219.2 | 1.500      |
| 1.600      | 219.2 | 220.4 | 221.5 | 222.7 | 223.8 | 225.0 | 226.2 | 227.3 | 228.5 | 229.6 | 230.8 | 1.600      |
| 1.700      | 230.8 | 232.0 | 233.1 | 234.3 | 235.4 | 236.6 | 237.7 | 238.9 | 240.0 | 241.1 | 242.3 | 1.700      |
| 1.800      | 242.3 | 243.4 | 244.6 | 245.7 | 246.9 | 248.0 | 249.1 | 250.3 | 251.4 | 252.5 | 253.7 | 1.800      |
| 1.900      | 253.7 | 254.8 | 255.9 | 257.1 | 258.2 | 259.3 | 260.4 | 261.5 | 262.7 | 263.8 | 264.9 | 1.900      |
| 2.000      | 264.9 | 266.1 | 267.2 | 268.3 | 269.4 | 270.5 | 271.7 | 272.8 | 273.9 | 275.0 | 276.1 | 2.000      |
| 2.100      | 276.1 | 277.2 | 278.4 | 279.5 | 280.6 | 281.7 | 282.8 | 283.9 | 285.0 | 286.1 | 287.2 | 2.100      |
| 2.200      | 287.2 | 288.3 | 289.4 | 290.5 | 291.6 | 292.7 | 293.8 | 294.9 | 296.0 | 297.1 | 298.2 | 2.200      |
| 2.300      | 298.2 | 299.3 | 300.4 | 301.5 | 302.6 | 303.7 | 304.8 | 305.9 | 307.0 | 308.1 | 309.2 | 2.300      |
| 2.400      | 309.2 | 310.3 | 311.4 | 312.5 | 313.5 | 314.6 | 315.7 | 316.8 | 317.9 | 319.0 | 320.1 | 2.400      |
| 2.500      | 320.1 | 321.2 | 322.2 | 323.3 | 324.4 | 325.5 | 326.6 | 327.6 | 328.7 | 329.8 | 330.9 | 2.500      |
| 2.600      | 330.9 | 331.9 | 333.0 | 334.1 | 335.2 | 336.3 | 337.3 | 338.4 | 339.5 | 340.6 | 341.6 | 2.600      |
| 2.700      | 341.6 | 342.7 | 343.8 | 344.8 | 345.9 | 347.0 | 348.1 | 349.1 | 350.2 | 351.3 | 352.3 | 2.700      |
| 2.800      | 352.3 | 353.4 | 354.5 | 355.5 | 356.6 | 357.7 | 358.7 | 359.8 | 360.8 | 361.9 | 363.0 | 2.800      |
| 2.900      | 363.0 | 364.0 | 365.1 | 366.2 | 367.2 | 368.3 | 369.3 | 370.4 | 371.5 | 372.5 | 373.6 | 2.900      |
| 3.000      | 373.6 | 374.6 | 375.7 | 376.7 | 377.8 | 378.9 | 379.9 | 381.0 | 382.0 | 383.1 | 384.1 | 3.000      |
| 3.100      | 384.1 | 385.2 | 386.2 | 387.3 | 388.3 | 389.4 | 390.4 | 391.5 | 392.5 | 393.6 | 394.6 | 3.100      |
| 3.200      | 394.6 | 395.7 | 396.7 | 397.8 | 398.8 | 399.9 | 400.9 | 402.0 | 403.0 | 404.1 | 405.1 | 3.200      |
| 3.300      | 405.1 | 406.2 | 407.2 | 408.3 | 409.3 | 410.4 | 411.4 | 412.4 | 413.5 | 414.5 | 415.6 | 3.300      |
| 3.400      | 415.6 | 416.6 | 417.7 | 418.7 | 419.8 | 420.8 | 421.8 | 422.9 | 423.9 | 425.0 | 426.0 | 3.400      |
| 3.500      | 426.0 | 427.0 | 428.1 | 429.1 | 430.2 | 431.2 | 432.2 | 433.3 | 434.3 | 435.3 | 436.4 | 3.500      |
| 3.600      | 436.4 | 437.4 | 438.5 | 439.5 | 440.5 | 441.6 | 442.6 | 443.6 | 444.7 | 445.7 | 446.7 | 3.600      |
| 3.700      | 446.7 | 447.8 | 448.8 | 449.8 | 450.9 | 451.9 | 452.9 | 453.9 | 455.0 | 456.0 | 457.0 | 3.700      |
| 3.800      | 457.0 | 458.1 | 459.1 | 460.1 | 461.1 | 462.2 | 463.2 | 464.2 | 465.3 | 466.3 | 467.3 | 3.800      |
| 3.900      | 467.3 | 468.3 | 469.4 | 470.4 | 471.4 | 472.4 | 473.5 | 474.5 | 475.5 | 476.5 | 477.5 | 3.900      |
| 4.000      | 477.5 | 478.6 | 479.6 | 480.6 | 481.6 | 482.6 | 483.7 | 484.7 | 485.7 | 486.7 | 487.7 | 4.000      |
| Millivolts | .000  | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts |

# Table 1. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts | .000  | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| Degrees C  |       |       |       |       |       |       |       |       |       |       |       |            |
| 4.000      | 477.5 | 478.6 | 479.6 | 480.6 | 481.6 | 482.6 | 483.7 | 484.7 | 485.7 | 486.7 | 487.7 | 4.000      |
| 4.100      | 487.7 | 488.8 | 489.8 | 490.8 | 491.8 | 492.8 | 493.8 | 494.9 | 495.9 | 496.9 | 497.9 | 4.100      |
| 4.200      | 497.9 | 498.9 | 499.9 | 501.0 | 502.0 | 503.0 | 504.0 | 505.0 | 506.0 | 507.0 | 508.0 | 4.200      |
| 4.300      | 508.0 | 509.0 | 510.1 | 511.1 | 512.1 | 513.1 | 514.1 | 515.1 | 516.1 | 517.1 | 518.1 | 4.300      |
| 4.400      | 518.1 | 519.1 | 520.1 | 521.2 | 522.2 | 523.2 | 524.2 | 525.2 | 526.2 | 527.2 | 528.2 | 4.400      |
| 4.500      | 528.2 | 529.2 | 530.2 | 531.2 | 532.2 | 533.2 | 534.2 | 535.2 | 536.2 | 537.2 | 538.2 | 4.500      |
| 4.600      | 538.2 | 539.2 | 540.2 | 541.2 | 542.2 | 543.2 | 544.2 | 545.2 | 546.2 | 547.2 | 548.2 | 4.600      |
| 4.700      | 548.2 | 549.2 | 550.2 | 551.2 | 552.2 | 553.2 | 554.2 | 555.2 | 556.2 | 557.2 | 558.2 | 4.700      |
| 4.800      | 558.2 | 559.2 | 560.2 | 561.1 | 562.1 | 563.1 | 564.1 | 565.1 | 566.1 | 567.1 | 568.1 | 4.800      |
| 4.900      | 568.1 | 569.1 | 570.1 | 571.1 | 572.1 | 573.0 | 574.0 | 575.0 | 576.0 | 577.0 | 578.0 | 4.900      |
| 5.000      | 578.0 | 579.0 | 580.0 | 581.0 | 581.9 | 582.9 | 583.9 | 584.9 | 585.9 | 586.9 | 587.8 | 5.000      |
| 5.100      | 587.8 | 588.8 | 589.8 | 590.8 | 591.8 | 592.8 | 593.7 | 594.7 | 595.7 | 596.7 | 597.7 | 5.100      |
| 5.200      | 597.7 | 598.6 | 599.6 | 600.6 | 601.6 | 602.6 | 603.5 | 604.5 | 605.5 | 606.5 | 607.5 | 5.200      |
| 5.300      | 607.5 | 608.4 | 609.4 | 610.4 | 611.4 | 612.4 | 613.3 | 614.3 | 615.3 | 616.3 | 617.2 | 5.300      |
| 5.400      | 617.2 | 618.2 | 619.2 | 620.2 | 621.1 | 622.1 | 623.1 | 624.0 | 625.0 | 626.0 | 627.0 | 5.400      |
| 5.500      | 627.0 | 627.9 | 628.9 | 629.8 | 630.8 | 631.8 | 632.8 | 633.7 | 634.7 | 635.7 | 636.6 | 5.500      |
| 5.600      | 636.6 | 637.6 | 638.6 | 639.6 | 640.5 | 641.5 | 642.5 | 643.4 | 644.4 | 645.4 | 646.3 | 5.600      |
| 5.700      | 646.3 | 647.3 | 648.3 | 649.2 | 650.2 | 651.2 | 652.1 | 653.1 | 654.1 | 655.0 | 656.0 | 5.700      |
| 5.800      | 656.0 | 656.9 | 657.9 | 658.9 | 659.8 | 660.8 | 661.8 | 662.7 | 663.7 | 664.7 | 665.6 | 5.800      |
| 5.900      | 665.6 | 666.6 | 667.5 | 668.5 | 669.5 | 670.4 | 671.4 | 672.3 | 673.3 | 674.2 | 675.2 | 5.900      |
| 6.000      | 675.2 | 676.2 | 677.1 | 678.1 | 679.0 | 680.0 | 681.0 | 681.9 | 682.9 | 683.8 | 684.8 | 6.000      |
| 6.100      | 684.8 | 685.7 | 686.7 | 687.6 | 688.6 | 689.6 | 690.5 | 691.5 | 692.4 | 693.4 | 694.3 | 6.100      |
| 6.200      | 694.3 | 695.3 | 696.2 | 697.2 | 698.1 | 699.1 | 700.0 | 701.0 | 701.9 | 702.9 | 703.8 | 6.200      |
| 6.300      | 703.8 | 704.8 | 705.7 | 706.7 | 707.6 | 708.6 | 709.5 | 710.5 | 711.4 | 712.4 | 713.3 | 6.300      |
| 6.400      | 713.3 | 714.2 | 715.2 | 716.1 | 717.1 | 718.0 | 719.0 | 719.9 | 720.9 | 721.8 | 722.8 | 6.400      |
| 6.500      | 722.8 | 723.7 | 724.6 | 725.6 | 726.5 | 727.5 | 728.4 | 729.3 | 730.3 | 731.2 | 732.2 | 6.500      |
| 6.600      | 732.2 | 733.1 | 734.1 | 735.0 | 735.9 | 736.9 | 737.8 | 738.8 | 739.7 | 740.6 | 741.6 | 6.600      |
| 6.700      | 741.6 | 742.5 | 743.4 | 744.4 | 745.3 | 746.2 | 747.2 | 748.1 | 749.1 | 750.0 | 750.9 | 6.700      |
| 6.800      | 750.9 | 751.9 | 752.8 | 753.7 | 754.7 | 755.6 | 756.5 | 757.5 | 758.4 | 759.3 | 760.3 | 6.800      |
| 6.900      | 760.3 | 761.2 | 762.1 | 763.1 | 764.0 | 764.9 | 765.9 | 766.8 | 767.7 | 768.6 | 769.6 | 6.900      |
| 7.000      | 769.6 | 770.5 | 771.4 | 772.4 | 773.3 | 774.2 | 775.1 | 776.1 | 777.0 | 777.9 | 778.9 | 7.000      |
| 7.100      | 778.9 | 779.8 | 780.7 | 781.6 | 782.6 | 783.5 | 784.4 | 785.3 | 786.3 | 787.2 | 788.1 | 7.100      |
| 7.200      | 788.1 | 789.0 | 790.0 | 790.9 | 791.8 | 792.7 | 793.6 | 794.6 | 795.5 | 796.4 | 797.3 | 7.200      |
| 7.300      | 797.3 | 798.3 | 799.2 | 800.1 | 801.0 | 801.9 | 802.9 | 803.8 | 804.7 | 805.6 | 806.5 | 7.300      |
| 7.400      | 806.5 | 807.5 | 808.4 | 809.3 | 810.2 | 811.1 | 812.0 | 813.0 | 813.9 | 814.8 | 815.7 | 7.400      |
| 7.500      | 815.7 | 816.6 | 817.5 | 818.5 | 819.4 | 820.3 | 821.2 | 822.1 | 823.0 | 823.9 | 824.9 | 7.500      |
| 7.600      | 824.9 | 825.8 | 826.7 | 827.6 | 828.5 | 829.4 | 830.3 | 831.2 | 832.2 | 833.1 | 834.0 | 7.600      |
| 7.700      | 834.0 | 834.9 | 835.8 | 836.7 | 837.6 | 838.5 | 839.4 | 840.3 | 841.3 | 842.2 | 843.1 | 7.700      |
| 7.800      | 843.1 | 844.0 | 844.9 | 845.8 | 846.7 | 847.6 | 848.5 | 849.4 | 850.3 | 851.2 | 852.1 | 7.800      |
| 7.900      | 852.1 | 853.0 | 853.9 | 854.9 | 855.8 | 856.7 | 857.6 | 858.5 | 859.4 | 860.3 | 861.2 | 7.900      |
| 8.000      | 861.2 | 862.1 | 863.0 | 863.9 | 864.8 | 865.7 | 866.6 | 867.5 | 868.4 | 869.3 | 870.2 | 8.000      |
| Millivolts | .000  | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts |



**Table 1. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.****(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)**

| Millivolts | .000      | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |
|------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|
|            | Degrees C |        |        |        |        |        |        |        |        |        |        |            |
| 8.000      | 861.2     | 862.1  | 863.0  | 863.9  | 864.8  | 865.7  | 866.6  | 867.5  | 868.4  | 869.3  | 870.2  | 8.000      |
| 8.100      | 870.2     | 871.1  | 872.0  | 872.9  | 873.8  | 874.7  | 875.6  | 876.5  | 877.4  | 878.3  | 879.2  | 8.100      |
| 8.200      | 879.2     | 880.1  | 881.0  | 881.9  | 882.8  | 883.7  | 884.6  | 885.5  | 886.4  | 887.3  | 888.2  | 8.200      |
| 8.300      | 888.2     | 889.1  | 890.0  | 890.9  | 891.7  | 892.6  | 893.5  | 894.4  | 895.3  | 896.2  | 897.1  | 8.300      |
| 8.400      | 897.1     | 898.0  | 898.9  | 899.8  | 900.7  | 901.6  | 902.5  | 903.4  | 904.2  | 905.1  | 906.0  | 8.400      |
| 8.500      | 906.0     | 906.9  | 907.8  | 908.7  | 909.6  | 910.5  | 911.4  | 912.3  | 913.1  | 914.0  | 914.9  | 8.500      |
| 8.600      | 914.9     | 915.8  | 916.7  | 917.6  | 918.5  | 919.4  | 920.3  | 921.1  | 922.0  | 922.9  | 923.8  | 8.600      |
| 8.700      | 923.8     | 924.7  | 925.6  | 926.5  | 927.3  | 928.2  | 929.1  | 930.0  | 930.9  | 931.8  | 932.6  | 8.700      |
| 8.800      | 932.6     | 933.5  | 934.4  | 935.3  | 936.2  | 937.1  | 937.9  | 938.8  | 939.7  | 940.6  | 941.5  | 8.800      |
| 8.900      | 941.5     | 942.3  | 943.2  | 944.1  | 945.0  | 945.9  | 946.7  | 947.6  | 948.5  | 949.4  | 950.3  | 8.900      |
| 9.000      | 950.3     | 951.1  | 952.0  | 952.9  | 953.8  | 954.7  | 955.5  | 956.4  | 957.3  | 958.2  | 959.0  | 9.000      |
| 9.100      | 959.0     | 959.9  | 960.8  | 961.7  | 962.5  | 963.4  | 964.3  | 965.2  | 966.1  | 966.9  | 967.8  | 9.100      |
| 9.200      | 967.8     | 968.7  | 969.5  | 970.4  | 971.3  | 972.2  | 973.0  | 973.9  | 974.8  | 975.7  | 976.5  | 9.200      |
| 9.300      | 976.5     | 977.4  | 978.3  | 979.1  | 980.0  | 980.9  | 981.8  | 982.6  | 983.5  | 984.4  | 985.2  | 9.300      |
| 9.400      | 985.2     | 986.1  | 987.0  | 987.8  | 988.7  | 989.6  | 990.5  | 991.3  | 992.2  | 993.1  | 993.9  | 9.400      |
| 9.500      | 993.9     | 994.8  | 995.7  | 996.5  | 997.4  | 998.3  | 999.1  | 1000.0 | 1000.9 | 1001.7 | 1002.6 | 9.500      |
| 9.600      | 1002.6    | 1003.5 | 1004.3 | 1005.2 | 1006.0 | 1006.9 | 1007.8 | 1008.6 | 1009.5 | 1010.4 | 1011.2 | 9.600      |
| 9.700      | 1011.2    | 1012.1 | 1013.0 | 1013.8 | 1014.7 | 1015.5 | 1016.4 | 1017.3 | 1018.1 | 1019.0 | 1019.8 | 9.700      |
| 9.800      | 1019.8    | 1020.7 | 1021.6 | 1022.4 | 1023.3 | 1024.1 | 1025.0 | 1025.9 | 1026.7 | 1027.6 | 1028.4 | 9.800      |
| 9.900      | 1028.4    | 1029.3 | 1030.2 | 1031.0 | 1031.9 | 1032.7 | 1033.6 | 1034.5 | 1035.3 | 1036.2 | 1037.0 | 9.900      |
| 10.000     | 1037.0    | 1037.9 | 1038.7 | 1039.6 | 1040.5 | 1041.3 | 1042.2 | 1043.0 | 1043.9 | 1044.7 | 1045.6 | 10.000     |
| 10.100     | 1045.6    | 1046.4 | 1047.3 | 1048.1 | 1049.0 | 1049.9 | 1050.7 | 1051.6 | 1052.4 | 1053.3 | 1054.1 | 10.100     |
| 10.200     | 1054.1    | 1055.0 | 1055.8 | 1056.7 | 1057.5 | 1058.4 | 1059.2 | 1060.1 | 1060.9 | 1061.8 | 1062.6 | 10.200     |
| 10.300     | 1062.6    | 1063.5 | 1064.3 | 1065.2 | 1066.0 | 1066.9 | 1067.7 | 1068.6 | 1069.4 | 1070.3 | 1071.1 | 10.300     |
| 10.400     | 1071.1    | 1072.0 | 1072.8 | 1073.7 | 1074.5 | 1075.4 | 1076.2 | 1077.1 | 1077.9 | 1078.8 | 1079.6 | 10.400     |
| 10.500     | 1079.6    | 1080.4 | 1081.3 | 1082.1 | 1083.0 | 1083.8 | 1084.7 | 1085.5 | 1086.4 | 1087.2 | 1088.1 | 10.500     |
| 10.600     | 1088.1    | 1088.9 | 1089.8 | 1090.6 | 1091.5 | 1092.3 | 1093.1 | 1094.0 | 1094.8 | 1095.7 | 1096.5 | 10.600     |
| 10.700     | 1096.5    | 1097.4 | 1098.2 | 1099.0 | 1099.9 | 1100.7 | 1101.6 | 1102.4 | 1103.3 | 1104.1 | 1105.0 | 10.700     |
| 10.800     | 1105.0    | 1105.8 | 1106.6 | 1107.5 | 1108.3 | 1109.2 | 1110.0 | 1110.8 | 1111.7 | 1112.5 | 1113.4 | 10.800     |
| 10.900     | 1113.4    | 1114.2 | 1115.1 | 1115.9 | 1116.7 | 1117.6 | 1118.4 | 1119.3 | 1120.1 | 1121.0 | 1121.8 | 10.900     |
| 11.000     | 1121.8    | 1122.6 | 1123.5 | 1124.3 | 1125.2 | 1126.0 | 1126.8 | 1127.7 | 1128.5 | 1129.3 | 1130.2 | 11.000     |
| 11.100     | 1130.2    | 1131.0 | 1131.9 | 1132.7 | 1133.5 | 1134.4 | 1135.2 | 1136.1 | 1136.9 | 1137.7 | 1138.6 | 11.100     |
| 11.200     | 1138.6    | 1139.4 | 1140.3 | 1141.1 | 1141.9 | 1142.8 | 1143.6 | 1144.4 | 1145.3 | 1146.1 | 1147.0 | 11.200     |
| 11.300     | 1147.0    | 1147.8 | 1148.6 | 1149.5 | 1150.3 | 1151.1 | 1152.0 | 1152.8 | 1153.7 | 1154.5 | 1155.3 | 11.300     |
| 11.400     | 1155.3    | 1156.2 | 1157.0 | 1157.8 | 1158.7 | 1159.5 | 1160.4 | 1161.2 | 1162.0 | 1162.9 | 1163.7 | 11.400     |
| 11.500     | 1163.7    | 1164.5 | 1165.4 | 1166.2 | 1167.0 | 1167.9 | 1168.7 | 1169.5 | 1170.4 | 1171.2 | 1172.0 | 11.500     |
| 11.600     | 1172.0    | 1172.9 | 1173.7 | 1174.6 | 1175.4 | 1176.2 | 1177.1 | 1177.9 | 1178.7 | 1179.6 | 1180.4 | 11.600     |
| 11.700     | 1180.4    | 1181.2 | 1182.1 | 1182.9 | 1183.7 | 1184.6 | 1185.4 | 1186.2 | 1187.1 | 1187.9 | 1188.7 | 11.700     |
| 11.800     | 1188.7    | 1189.6 | 1190.4 | 1191.2 | 1192.1 | 1192.9 | 1193.7 | 1194.6 | 1195.4 | 1196.2 | 1197.1 | 11.800     |
| 11.900     | 1197.1    | 1197.9 | 1198.7 | 1199.6 | 1200.4 | 1201.2 | 1202.1 | 1202.9 | 1203.7 | 1204.6 | 1205.4 | 11.900     |
| 12.000     | 1205.4    | 1206.2 | 1207.1 | 1207.9 | 1208.7 | 1209.6 | 1210.4 | 1211.2 | 1212.1 | 1212.9 | 1213.7 | 12.000     |
| Millivolts | .000      | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |

# Table 1. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------|
| Degrees C  |         |         |         |         |         |         |         |         |         |         |         |            |
| 12. 000    | 1205. 4 | 1206. 2 | 1207. 1 | 1207. 9 | 1208. 7 | 1209. 6 | 1210. 4 | 1211. 2 | 1212. 1 | 1212. 9 | 1213. 7 | 12. 000    |
| 12. 100    | 1213. 7 | 1214. 6 | 1215. 4 | 1216. 2 | 1217. 1 | 1217. 9 | 1218. 7 | 1219. 5 | 1220. 4 | 1221. 2 | 1222. 0 | 12. 100    |
| 12. 200    | 1222. 0 | 1222. 9 | 1223. 7 | 1224. 5 | 1225. 4 | 1226. 2 | 1227. 0 | 1227. 9 | 1228. 7 | 1229. 5 | 1230. 4 | 12. 200    |
| 12. 300    | 1230. 4 | 1231. 2 | 1232. 0 | 1232. 9 | 1233. 7 | 1234. 5 | 1235. 4 | 1236. 2 | 1237. 0 | 1237. 8 | 1238. 7 | 12. 300    |
| 12. 400    | 1238. 7 | 1239. 5 | 1240. 3 | 1241. 2 | 1242. 0 | 1242. 8 | 1243. 7 | 1244. 5 | 1245. 3 | 1246. 2 | 1247. 0 | 12. 400    |
| 12. 500    | 1247. 0 | 1247. 8 | 1248. 7 | 1249. 5 | 1250. 3 | 1251. 1 | 1252. 0 | 1252. 8 | 1253. 6 | 1254. 5 | 1255. 3 | 12. 500    |
| 12. 600    | 1255. 3 | 1256. 1 | 1257. 0 | 1257. 8 | 1258. 6 | 1259. 5 | 1260. 3 | 1261. 1 | 1261. 9 | 1262. 8 | 1263. 6 | 12. 600    |
| 12. 700    | 1263. 6 | 1264. 4 | 1265. 3 | 1266. 1 | 1266. 9 | 1267. 8 | 1268. 6 | 1269. 4 | 1270. 2 | 1271. 1 | 1271. 9 | 12. 700    |
| 12. 800    | 1271. 9 | 1272. 7 | 1273. 6 | 1274. 4 | 1275. 2 | 1276. 1 | 1276. 9 | 1277. 7 | 1278. 6 | 1279. 4 | 1280. 2 | 12. 800    |
| 12. 900    | 1280. 2 | 1281. 1 | 1281. 9 | 1282. 7 | 1283. 6 | 1284. 4 | 1285. 2 | 1286. 0 | 1286. 9 | 1287. 7 | 1288. 5 | 12. 900    |
| 13. 000    | 1288. 5 | 1289. 4 | 1290. 2 | 1291. 0 | 1291. 9 | 1292. 7 | 1293. 5 | 1294. 4 | 1295. 2 | 1296. 0 | 1296. 9 | 13. 000    |
| 13. 100    | 1296. 9 | 1297. 7 | 1298. 5 | 1299. 4 | 1300. 2 | 1301. 0 | 1301. 9 | 1302. 7 | 1303. 5 | 1304. 4 | 1305. 2 | 13. 100    |
| 13. 200    | 1305. 2 | 1306. 0 | 1306. 8 | 1307. 7 | 1308. 5 | 1309. 3 | 1310. 2 | 1311. 0 | 1311. 8 | 1312. 7 | 1313. 5 | 13. 200    |
| 13. 300    | 1313. 5 | 1314. 3 | 1315. 2 | 1316. 0 | 1316. 8 | 1317. 7 | 1318. 5 | 1319. 3 | 1320. 2 | 1321. 0 | 1321. 8 | 13. 300    |
| 13. 400    | 1321. 8 | 1322. 7 | 1323. 5 | 1324. 3 | 1325. 2 | 1326. 0 | 1326. 8 | 1327. 7 | 1328. 5 | 1329. 3 | 1330. 2 | 13. 400    |
| 13. 500    | 1330. 2 | 1331. 0 | 1331. 8 | 1332. 7 | 1333. 5 | 1334. 3 | 1335. 2 | 1336. 0 | 1336. 8 | 1337. 7 | 1338. 5 | 13. 500    |
| 13. 600    | 1338. 5 | 1339. 3 | 1340. 2 | 1341. 0 | 1341. 8 | 1342. 7 | 1343. 5 | 1344. 3 | 1345. 2 | 1346. 0 | 1346. 8 | 13. 600    |
| 13. 700    | 1346. 8 | 1347. 7 | 1348. 5 | 1349. 3 | 1350. 2 | 1351. 0 | 1351. 8 | 1352. 7 | 1353. 5 | 1354. 3 | 1355. 2 | 13. 700    |
| 13. 800    | 1355. 2 | 1356. 0 | 1356. 8 | 1357. 7 | 1358. 5 | 1359. 3 | 1360. 2 | 1361. 0 | 1361. 8 | 1362. 7 | 1363. 5 | 13. 800    |
| 13. 900    | 1363. 5 | 1364. 3 | 1365. 2 | 1366. 0 | 1366. 9 | 1367. 7 | 1368. 5 | 1369. 4 | 1370. 2 | 1371. 0 | 1371. 9 | 13. 900    |
| 14. 000    | 1371. 9 | 1372. 7 | 1373. 5 | 1374. 4 | 1375. 2 | 1376. 0 | 1376. 9 | 1377. 7 | 1378. 5 | 1379. 4 | 1380. 2 | 14. 000    |
| 14. 100    | 1380. 2 | 1381. 0 | 1381. 9 | 1382. 7 | 1383. 5 | 1384. 4 | 1385. 2 | 1386. 1 | 1386. 9 | 1387. 7 | 1388. 6 | 14. 100    |
| 14. 200    | 1388. 6 | 1389. 4 | 1390. 2 | 1391. 1 | 1391. 9 | 1392. 7 | 1393. 6 | 1394. 4 | 1395. 2 | 1396. 1 | 1396. 9 | 14. 200    |
| 14. 300    | 1396. 9 | 1397. 7 | 1398. 6 | 1399. 4 | 1400. 2 | 1401. 1 | 1401. 9 | 1402. 8 | 1403. 6 | 1404. 4 | 1405. 3 | 14. 300    |
| 14. 400    | 1405. 3 | 1406. 1 | 1406. 9 | 1407. 8 | 1408. 6 | 1409. 4 | 1410. 3 | 1411. 1 | 1411. 9 | 1412. 8 | 1413. 6 | 14. 400    |
| 14. 500    | 1413. 6 | 1414. 5 | 1415. 3 | 1416. 1 | 1417. 0 | 1417. 8 | 1418. 6 | 1419. 5 | 1420. 3 | 1421. 2 | 1422. 0 | 14. 500    |
| 14. 600    | 1422. 0 | 1422. 8 | 1423. 7 | 1424. 5 | 1425. 3 | 1426. 2 | 1427. 0 | 1427. 9 | 1428. 7 | 1429. 5 | 1430. 4 | 14. 600    |
| 14. 700    | 1430. 4 | 1431. 2 | 1432. 0 | 1432. 9 | 1433. 7 | 1434. 5 | 1435. 4 | 1436. 2 | 1437. 1 | 1437. 9 | 1438. 7 | 14. 700    |
| 14. 800    | 1438. 7 | 1439. 6 | 1440. 4 | 1441. 2 | 1442. 1 | 1442. 9 | 1443. 8 | 1444. 6 | 1445. 4 | 1446. 3 | 1447. 1 | 14. 800    |
| 14. 900    | 1447. 1 | 1447. 9 | 1448. 8 | 1449. 6 | 1450. 5 | 1451. 3 | 1452. 1 | 1453. 0 | 1453. 8 | 1454. 6 | 1455. 5 | 14. 900    |
| 15. 000    | 1455. 5 | 1456. 3 | 1457. 2 | 1458. 0 | 1458. 8 | 1459. 7 | 1460. 5 | 1461. 4 | 1462. 2 | 1463. 0 | 1463. 9 | 15. 000    |
| 15. 100    | 1463. 9 | 1464. 7 | 1465. 5 | 1466. 4 | 1467. 2 | 1468. 1 | 1468. 9 | 1469. 7 | 1470. 6 | 1471. 4 | 1472. 3 | 15. 100    |
| 15. 200    | 1472. 3 | 1473. 1 | 1473. 9 | 1474. 8 | 1475. 6 | 1476. 5 | 1477. 3 | 1478. 1 | 1479. 0 | 1479. 8 | 1480. 7 | 15. 200    |
| 15. 300    | 1480. 7 | 1481. 5 | 1482. 3 | 1483. 2 | 1484. 0 | 1484. 8 | 1485. 7 | 1486. 5 | 1487. 4 | 1488. 2 | 1489. 0 | 15. 300    |
| 15. 400    | 1489. 0 | 1489. 9 | 1490. 7 | 1491. 6 | 1492. 4 | 1493. 2 | 1494. 1 | 1494. 9 | 1495. 8 | 1496. 6 | 1497. 5 | 15. 400    |
| 15. 500    | 1497. 5 | 1498. 3 | 1499. 1 | 1500. 0 | 1500. 8 | 1501. 7 | 1502. 5 | 1503. 3 | 1504. 2 | 1505. 0 | 1505. 9 | 15. 500    |
| 15. 600    | 1505. 9 | 1506. 7 | 1507. 5 | 1508. 4 | 1509. 2 | 1510. 1 | 1510. 9 | 1511. 7 | 1512. 6 | 1513. 4 | 1514. 3 | 15. 600    |
| 15. 700    | 1514. 3 | 1515. 1 | 1516. 0 | 1516. 8 | 1517. 6 | 1518. 5 | 1519. 3 | 1520. 2 | 1521. 0 | 1521. 8 | 1522. 7 | 15. 700    |
| 15. 800    | 1522. 7 | 1523. 5 | 1524. 4 | 1525. 2 | 1526. 1 | 1526. 9 | 1527. 7 | 1528. 6 | 1529. 4 | 1530. 3 | 1531. 1 | 15. 800    |
| 15. 900    | 1531. 1 | 1532. 0 | 1532. 8 | 1533. 6 | 1534. 5 | 1535. 3 | 1536. 2 | 1537. 0 | 1537. 8 | 1538. 7 | 1539. 5 | 15. 900    |
| 16. 000    | 1539. 5 | 1540. 4 | 1541. 2 | 1542. 1 | 1542. 9 | 1543. 8 | 1544. 6 | 1545. 4 | 1546. 3 | 1547. 1 | 1548. 0 | 16. 000    |
| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |



**Table 1. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**  
 (Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts | .000   | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|
| Degrees C  |        |        |        |        |        |        |        |        |        |        |        |            |
| 16.000     | 1539.5 | 1540.4 | 1541.2 | 1542.1 | 1542.9 | 1543.8 | 1544.6 | 1545.4 | 1546.3 | 1547.1 | 1548.0 | 16.000     |
| 16.100     | 1548.0 | 1548.8 | 1549.7 | 1550.5 | 1551.3 | 1552.2 | 1553.0 | 1553.9 | 1554.7 | 1555.6 | 1556.4 | 16.100     |
| 16.200     | 1556.4 | 1557.2 | 1558.1 | 1558.9 | 1559.8 | 1560.6 | 1561.5 | 1562.3 | 1563.2 | 1564.0 | 1564.8 | 16.200     |
| 16.300     | 1564.8 | 1565.7 | 1566.5 | 1567.4 | 1568.2 | 1569.1 | 1569.9 | 1570.8 | 1571.6 | 1572.4 | 1573.3 | 16.300     |
| 16.400     | 1573.3 | 1574.1 | 1575.0 | 1575.8 | 1576.7 | 1577.5 | 1578.4 | 1579.2 | 1580.1 | 1580.9 | 1581.8 | 16.400     |
| 16.500     | 1581.8 | 1582.6 | 1583.4 | 1584.3 | 1585.1 | 1586.0 | 1586.8 | 1587.7 | 1588.5 | 1589.4 | 1590.2 | 16.500     |
| 16.600     | 1590.2 | 1591.1 | 1591.9 | 1592.8 | 1593.6 | 1594.4 | 1595.3 | 1596.1 | 1597.0 | 1597.8 | 1598.7 | 16.600     |
| 16.700     | 1598.7 | 1599.5 | 1600.4 | 1601.2 | 1602.1 | 1602.9 | 1603.8 | 1604.6 | 1605.5 | 1606.3 | 1607.1 | 16.700     |
| 16.800     | 1607.1 | 1608.0 | 1608.8 | 1609.7 | 1610.5 | 1611.4 | 1612.2 | 1613.1 | 1613.9 | 1614.8 | 1615.6 | 16.800     |
| 16.900     | 1615.6 | 1616.5 | 1617.3 | 1618.2 | 1619.0 | 1619.9 | 1620.7 | 1621.6 | 1622.4 | 1623.3 | 1624.1 | 16.900     |
| 17.000     | 1624.1 | 1625.0 | 1625.8 | 1626.7 | 1627.5 | 1628.4 | 1629.2 | 1630.1 | 1630.9 | 1631.8 | 1632.6 | 17.000     |
| 17.100     | 1632.6 | 1633.5 | 1634.3 | 1635.2 | 1636.0 | 1636.9 | 1637.7 | 1638.6 | 1639.4 | 1640.3 | 1641.1 | 17.100     |
| 17.200     | 1641.1 | 1642.0 | 1642.8 | 1643.7 | 1644.5 | 1645.4 | 1646.2 | 1647.1 | 1647.9 | 1648.8 | 1649.6 | 17.200     |
| 17.300     | 1649.6 | 1650.5 | 1651.3 | 1652.2 | 1653.0 | 1653.9 | 1654.7 | 1655.6 | 1656.4 | 1657.3 | 1658.1 | 17.300     |
| 17.400     | 1658.1 | 1659.0 | 1659.8 | 1660.7 | 1661.5 | 1662.4 | 1663.2 | 1664.1 | 1664.9 | 1665.8 | 1666.6 | 17.400     |
| 17.500     | 1666.6 | 1667.5 | 1668.3 | 1669.2 | 1670.0 | 1670.9 | 1671.8 | 1672.6 | 1673.5 | 1674.3 | 1675.2 | 17.500     |
| 17.600     | 1675.2 | 1676.0 | 1676.9 | 1677.7 | 1678.6 | 1679.4 | 1680.3 | 1681.1 | 1682.0 | 1682.8 | 1683.7 | 17.600     |
| 17.700     | 1683.7 | 1684.6 | 1685.4 | 1686.3 | 1687.1 | 1688.0 | 1688.8 | 1689.7 | 1690.5 | 1691.4 | 1692.2 | 17.700     |
| 17.800     | 1692.2 | 1693.1 | 1693.9 | 1694.8 | 1695.7 | 1696.5 | 1697.4 | 1698.2 | 1699.1 | 1699.9 | 1700.8 | 17.800     |
| 17.900     | 1700.8 | 1701.6 | 1702.5 | 1703.4 | 1704.2 | 1705.1 | 1705.9 | 1706.8 | 1707.6 | 1708.5 | 1709.3 | 17.900     |
| 18.000     | 1709.3 | 1710.2 | 1711.1 | 1711.9 | 1712.8 | 1713.6 | 1714.5 | 1715.3 | 1716.2 | 1717.1 | 1717.9 | 18.000     |
| 18.100     | 1717.9 | 1718.8 | 1719.6 | 1720.5 | 1721.3 | 1722.2 | 1723.0 | 1723.9 | 1724.8 | 1725.6 | 1726.5 | 18.100     |
| 18.200     | 1726.5 | 1727.3 | 1728.2 | 1729.0 | 1729.9 | 1730.8 | 1731.6 | 1732.5 | 1733.3 | 1734.2 | 1735.1 | 18.200     |
| 18.300     | 1735.1 | 1735.9 | 1736.8 | 1737.6 | 1738.5 | 1739.3 | 1740.2 | 1741.1 | 1741.9 | 1742.8 | 1743.6 | 18.300     |
| 18.400     | 1743.6 | 1744.5 | 1745.4 | 1746.2 | 1747.1 | 1747.9 | 1748.8 | 1749.7 | 1750.5 | 1751.4 | 1752.2 | 18.400     |
| 18.500     | 1752.2 | 1753.1 | 1754.0 | 1754.8 | 1755.7 | 1756.5 | 1757.4 | 1758.3 | 1759.1 | 1760.0 | 1760.8 | 18.500     |
| 18.600     | 1760.8 | 1761.7 | 1762.6 | 1763.4 | 1764.3 | 1765.1 | 1766.0 | 1766.9 | 1767.7 | 1768.6 | -----  | 18.600     |
| Millivolts | .000   | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |

# Table 2. Platinum Versus Platinum-10-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| ° C | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° C |
|-----|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|     | Millivolts |       |       |       |       |       |       |       |       |       |       |     |
| 0   | 0.000      | 0.005 | 0.011 | 0.016 | 0.022 | 0.028 | 0.033 | 0.039 | 0.044 | 0.050 | 0.056 | 0   |
| 10  | .056       | .061  | .067  | .073  | .078  | .084  | .090  | .096  | .102  | .107  | .113  | 10  |
| 20  | .113       | .119  | .125  | .131  | .137  | .143  | .149  | .155  | .161  | .167  | .173  | 20  |
| 30  | .173       | .179  | .185  | .191  | .198  | .204  | .210  | .216  | .222  | .229  | .235  | 30  |
| 40  | .235       | .241  | .247  | .254  | .260  | .266  | .273  | .279  | .286  | .292  | .299  | 40  |
| 50  | .299       | .305  | .312  | .318  | .325  | .331  | .338  | .344  | .351  | .357  | .364  | 50  |
| 60  | .364       | .371  | .377  | .384  | .391  | .397  | .404  | .411  | .418  | .425  | .431  | 60  |
| 70  | .431       | .438  | .445  | .452  | .459  | .466  | .473  | .479  | .486  | .493  | .500  | 70  |
| 80  | .500       | .507  | .514  | .521  | .528  | .535  | .543  | .550  | .557  | .564  | .571  | 80  |
| 90  | .571       | .578  | .585  | .593  | .600  | .607  | .614  | .621  | .629  | .636  | .643  | 90  |
| 100 | .643       | .651  | .658  | .665  | .673  | .680  | .687  | .694  | .702  | .709  | .717  | 100 |
| 110 | .717       | .724  | .732  | .739  | .747  | .754  | .762  | .769  | .777  | .784  | .792  | 110 |
| 120 | .792       | .800  | .807  | .815  | .823  | .830  | .838  | .845  | .853  | .861  | .869  | 120 |
| 130 | .869       | .876  | .884  | .892  | .900  | .907  | .915  | .923  | .931  | .939  | .946  | 130 |
| 140 | .946       | .954  | .962  | .970  | .978  | .986  | .994  | 1.002 | 1.009 | 1.017 | 1.025 | 140 |
| 150 | 1.025      | 1.033 | 1.041 | 1.049 | 1.057 | 1.065 | 1.073 | 1.081 | 1.089 | 1.097 | 1.106 | 150 |
| 160 | 1.106      | 1.114 | 1.122 | 1.130 | 1.138 | 1.146 | 1.154 | 1.162 | 1.170 | 1.179 | 1.187 | 160 |
| 170 | 1.187      | 1.195 | 1.203 | 1.211 | 1.220 | 1.228 | 1.236 | 1.244 | 1.253 | 1.261 | 1.269 | 170 |
| 180 | 1.269      | 1.277 | 1.286 | 1.294 | 1.302 | 1.311 | 1.319 | 1.327 | 1.336 | 1.344 | 1.352 | 180 |
| 190 | 1.352      | 1.361 | 1.369 | 1.377 | 1.386 | 1.394 | 1.403 | 1.411 | 1.419 | 1.428 | 1.436 | 190 |
| 200 | 1.436      | 1.445 | 1.453 | 1.462 | 1.470 | 1.479 | 1.487 | 1.496 | 1.504 | 1.513 | 1.521 | 200 |
| 210 | 1.521      | 1.530 | 1.538 | 1.547 | 1.555 | 1.564 | 1.573 | 1.581 | 1.590 | 1.598 | 1.607 | 210 |
| 220 | 1.607      | 1.615 | 1.624 | 1.633 | 1.641 | 1.650 | 1.659 | 1.667 | 1.676 | 1.685 | 1.693 | 220 |
| 230 | 1.693      | 1.702 | 1.710 | 1.719 | 1.728 | 1.736 | 1.745 | 1.754 | 1.763 | 1.771 | 1.780 | 230 |
| 240 | 1.780      | 1.789 | 1.798 | 1.806 | 1.815 | 1.824 | 1.833 | 1.841 | 1.850 | 1.859 | 1.868 | 240 |
| 250 | 1.868      | 1.877 | 1.885 | 1.894 | 1.903 | 1.912 | 1.921 | 1.930 | 1.938 | 1.947 | 1.956 | 250 |
| 260 | 1.956      | 1.965 | 1.974 | 1.983 | 1.992 | 2.001 | 2.009 | 2.018 | 2.027 | 2.036 | 2.045 | 260 |
| 270 | 2.045      | 2.054 | 2.063 | 2.072 | 2.081 | 2.090 | 2.099 | 2.108 | 2.117 | 2.126 | 2.135 | 270 |
| 280 | 2.135      | 2.144 | 2.153 | 2.162 | 2.171 | 2.180 | 2.189 | 2.198 | 2.207 | 2.216 | 2.225 | 280 |
| 290 | 2.225      | 2.234 | 2.243 | 2.252 | 2.261 | 2.271 | 2.280 | 2.289 | 2.298 | 2.307 | 2.316 | 290 |
| 300 | 2.316      | 2.325 | 2.334 | 2.343 | 2.353 | 2.362 | 2.371 | 2.380 | 2.389 | 2.398 | 2.408 | 300 |
| 310 | 2.408      | 2.417 | 2.426 | 2.435 | 2.444 | 2.453 | 2.463 | 2.472 | 2.481 | 2.490 | 2.499 | 310 |
| 320 | 2.499      | 2.509 | 2.518 | 2.527 | 2.536 | 2.546 | 2.555 | 2.564 | 2.573 | 2.583 | 2.592 | 320 |
| 330 | 2.592      | 2.601 | 2.610 | 2.620 | 2.629 | 2.638 | 2.648 | 2.657 | 2.666 | 2.676 | 2.685 | 330 |
| 340 | 2.685      | 2.694 | 2.704 | 2.713 | 2.722 | 2.731 | 2.741 | 2.750 | 2.760 | 2.769 | 2.778 | 340 |
| 350 | 2.778      | 2.788 | 2.797 | 2.806 | 2.816 | 2.825 | 2.834 | 2.844 | 2.853 | 2.863 | 2.872 | 350 |
| 360 | 2.872      | 2.881 | 2.891 | 2.900 | 2.910 | 2.919 | 2.929 | 2.938 | 2.947 | 2.957 | 2.966 | 360 |
| 370 | 2.966      | 2.976 | 2.985 | 2.995 | 3.004 | 3.014 | 3.023 | 3.032 | 3.042 | 3.051 | 3.061 | 370 |
| 380 | 3.061      | 3.070 | 3.080 | 3.089 | 3.099 | 3.108 | 3.118 | 3.127 | 3.137 | 3.146 | 3.156 | 380 |
| 390 | 3.156      | 3.165 | 3.175 | 3.184 | 3.194 | 3.203 | 3.213 | 3.222 | 3.232 | 3.241 | 3.251 | 390 |
| 400 | 3.251      | 3.261 | 3.270 | 3.280 | 3.289 | 3.299 | 3.308 | 3.318 | 3.327 | 3.337 | 3.347 | 400 |
| ° C | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° C |



# Table 2. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| ° C                                                                        | 0                          | 1                          | 2                          | 3                          | 4                          | 5                          | 6                          | 7                          | 8                          | 9                          | 10                         | ° C                                                                            |
|----------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--------------------------------------------------------------------------------|
| 400<br>410<br>420<br>430<br><br>440<br>450<br>460<br><br>470<br>480<br>490 | Millivolts                 |                            |                            |                            |                            |                            |                            |                            |                            |                            |                            | 400<br><br>410<br>420<br>430<br><br>440<br>450<br>460<br><br>470<br>480<br>490 |
|                                                                            | 3. 251                     | 3. 261                     | 3. 270                     | 3. 280                     | 3. 289                     | 3. 299                     | 3. 308                     | 3. 318                     | 3. 327                     | 3. 337                     | 3. 347                     |                                                                                |
|                                                                            | 3. 347                     | 3. 356                     | 3. 366                     | 3. 375                     | 3. 385                     | 3. 394                     | 3. 404                     | 3. 414                     | 3. 423                     | 3. 433                     | 3. 442                     |                                                                                |
|                                                                            | 3. 442                     | 3. 452                     | 3. 462                     | 3. 471                     | 3. 481                     | 3. 490                     | 3. 500                     | 3. 510                     | 3. 519                     | 3. 529                     | 3. 539                     |                                                                                |
|                                                                            | 3. 539                     | 3. 548                     | 3. 558                     | 3. 567                     | 3. 577                     | 3. 587                     | 3. 596                     | 3. 606                     | 3. 616                     | 3. 625                     | 3. 635                     |                                                                                |
|                                                                            | 3. 635                     | 3. 645                     | 3. 654                     | 3. 664                     | 3. 674                     | 3. 683                     | 3. 693                     | 3. 703                     | 3. 712                     | 3. 722                     | 3. 732                     |                                                                                |
|                                                                            | 3. 732                     | 3. 741                     | 3. 751                     | 3. 761                     | 3. 771                     | 3. 780                     | 3. 790                     | 3. 800                     | 3. 809                     | 3. 819                     | 3. 829                     |                                                                                |
|                                                                            | 3. 829                     | 3. 839                     | 3. 848                     | 3. 858                     | 3. 868                     | 3. 878                     | 3. 887                     | 3. 897                     | 3. 907                     | 3. 917                     | 3. 926                     |                                                                                |
|                                                                            | 3. 926                     | 3. 936                     | 3. 946                     | 3. 956                     | 3. 965                     | 3. 975                     | 3. 985                     | 3. 995                     | 4. 004                     | 4. 014                     | 4. 024                     |                                                                                |
|                                                                            | 4. 024                     | 4. 034                     | 4. 044                     | 4. 053                     | 4. 063                     | 4. 073                     | 4. 083                     | 4. 093                     | 4. 103                     | 4. 112                     | 4. 122                     |                                                                                |
|                                                                            | 4. 122                     | 4. 132                     | 4. 142                     | 4. 152                     | 4. 162                     | 4. 171                     | 4. 181                     | 4. 191                     | 4. 201                     | 4. 211                     | 4. 221                     |                                                                                |
| 500                                                                        | 4. 221                     | 4. 230                     | 4. 240                     | 4. 250                     | 4. 260                     | 4. 270                     | 4. 280                     | 4. 290                     | 4. 300                     | 4. 310                     | 4. 319                     | 500                                                                            |
| 510<br>520<br>530                                                          | 4. 319<br>4. 419<br>4. 518 | 4. 329<br>4. 428<br>4. 528 | 4. 339<br>4. 438<br>4. 538 | 4. 349<br>4. 448<br>4. 548 | 4. 359<br>4. 458<br>4. 558 | 4. 369<br>4. 468<br>4. 568 | 4. 379<br>4. 478<br>4. 578 | 4. 389<br>4. 488<br>4. 588 | 4. 399<br>4. 498<br>4. 598 | 4. 409<br>4. 508<br>4. 608 | 4. 419<br>4. 518<br>4. 618 | 510<br>520<br>530                                                              |
| 540<br>550<br>560                                                          | 4. 618<br>4. 718<br>4. 818 | 4. 628<br>4. 728<br>4. 828 | 4. 638<br>4. 738<br>4. 839 | 4. 648<br>4. 748<br>4. 849 | 4. 658<br>4. 758<br>4. 859 | 4. 668<br>4. 768<br>4. 869 | 4. 678<br>4. 778<br>4. 879 | 4. 688<br>4. 788<br>4. 889 | 4. 698<br>4. 798<br>4. 899 | 4. 708<br>4. 808<br>4. 909 | 4. 718<br>4. 818<br>4. 919 | 540<br>550<br>560                                                              |
| 570<br>580<br>590                                                          | 4. 919<br>5. 020<br>5. 122 | 4. 929<br>5. 031<br>5. 132 | 4. 939<br>5. 041<br>5. 142 | 4. 950<br>5. 051<br>5. 152 | 4. 960<br>5. 061<br>5. 163 | 4. 970<br>5. 071<br>5. 173 | 4. 980<br>5. 081<br>5. 183 | 4. 990<br>5. 091<br>5. 193 | 5. 000<br>5. 102<br>5. 203 | 5. 010<br>5. 112<br>5. 214 | 5. 020<br>5. 122<br>5. 224 | 570<br>580<br>590                                                              |
| 600                                                                        | 5. 224                     | 5. 234                     | 5. 244                     | 5. 254                     | 5. 265                     | 5. 275                     | 5. 285                     | 5. 295                     | 5. 306                     | 5. 316                     | 5. 326                     | 600                                                                            |
| 610<br>620<br>630                                                          | 5. 326<br>5. 429<br>5. 532 | 5. 336<br>5. 439<br>5. 542 | 5. 346<br>5. 449<br>5. 552 | 5. 357<br>5. 459<br>5. 563 | 5. 367<br>5. 470<br>5. 573 | 5. 377<br>5. 480<br>5. 583 | 5. 388<br>5. 490<br>5. 593 | 5. 398<br>5. 501<br>5. 604 | 5. 408<br>5. 511<br>5. 614 | 5. 418<br>5. 521<br>5. 624 | 5. 429<br>5. 532<br>5. 635 | 610<br>620<br>630                                                              |
| 640<br>650<br>660                                                          | 5. 635<br>5. 738<br>5. 842 | 5. 645<br>5. 748<br>5. 852 | 5. 655<br>5. 759<br>5. 862 | 5. 666<br>5. 769<br>5. 873 | 5. 676<br>5. 779<br>5. 883 | 5. 686<br>5. 790<br>5. 894 | 5. 697<br>5. 800<br>5. 904 | 5. 707<br>5. 811<br>5. 914 | 5. 717<br>5. 821<br>5. 925 | 5. 728<br>5. 831<br>5. 935 | 5. 738<br>5. 842<br>5. 946 | 640<br>650<br>660                                                              |
| 670<br>680<br>690                                                          | 5. 946<br>6. 050<br>6. 155 | 5. 956<br>6. 060<br>6. 165 | 5. 967<br>6. 071<br>6. 176 | 5. 977<br>6. 081<br>6. 186 | 5. 987<br>6. 092<br>6. 197 | 5. 998<br>6. 102<br>6. 207 | 6. 008<br>6. 113<br>6. 218 | 6. 019<br>6. 123<br>6. 228 | 6. 029<br>6. 134<br>6. 239 | 6. 040<br>6. 144<br>6. 249 | 6. 050<br>6. 155<br>6. 260 | 670<br>680<br>690                                                              |
| 700                                                                        | 6. 260                     | 6. 270                     | 6. 281                     | 6. 291                     | 6. 302                     | 6. 312                     | 6. 323                     | 6. 333                     | 6. 344                     | 6. 355                     | 6. 365                     | 700                                                                            |
| 710<br>720<br>730                                                          | 6. 365<br>6. 471<br>6. 577 | 6. 376<br>6. 481<br>6. 588 | 6. 386<br>6. 492<br>6. 598 | 6. 397<br>6. 503<br>6. 609 | 6. 407<br>6. 513<br>6. 619 | 6. 418<br>6. 524<br>6. 630 | 6. 429<br>6. 534<br>6. 641 | 6. 439<br>6. 545<br>6. 651 | 6. 450<br>6. 556<br>6. 662 | 6. 460<br>6. 566<br>6. 673 | 6. 471<br>6. 577<br>6. 683 | 710<br>720<br>730                                                              |
| 740<br>750<br>760                                                          | 6. 683<br>6. 790<br>6. 897 | 6. 694<br>6. 801<br>6. 908 | 6. 705<br>6. 811<br>6. 919 | 6. 715<br>6. 822<br>6. 929 | 6. 726<br>6. 833<br>6. 940 | 6. 737<br>6. 844<br>6. 951 | 6. 747<br>6. 854<br>6. 962 | 6. 758<br>6. 865<br>6. 972 | 6. 769<br>6. 876<br>6. 983 | 6. 779<br>6. 886<br>6. 994 | 6. 790<br>6. 897<br>7. 005 | 740<br>750<br>760                                                              |
| 770<br>780<br>790                                                          | 7. 005<br>7. 112<br>7. 220 | 7. 015<br>7. 123<br>7. 231 | 7. 026<br>7. 134<br>7. 242 | 7. 037<br>7. 145<br>7. 253 | 7. 047<br>7. 156<br>7. 264 | 7. 058<br>7. 166<br>7. 275 | 7. 069<br>7. 177<br>7. 286 | 7. 080<br>7. 188<br>7. 296 | 7. 091<br>7. 199<br>7. 307 | 7. 102<br>7. 210<br>7. 318 | 7. 112<br>7. 220<br>7. 329 | 770<br>780<br>790                                                              |
| 800                                                                        | 7. 329                     | 7. 340                     | 7. 351                     | 7. 362                     | 7. 372                     | 7. 383                     | 7. 394                     | 7. 405                     | 7. 416                     | 7. 427                     | 7. 438                     | 800                                                                            |
| ° C                                                                        | 0                          | 1                          | 2                          | 3                          | 4                          | 5                          | 6                          | 7                          | 8                          | 9                          | 10                         | ° C                                                                            |

# Table 2. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| °C         | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °C    |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| Millivolts |        |        |        |        |        |        |        |        |        |        |        |       |
| 800        | 7.329  | 7.340  | 7.351  | 7.362  | 7.372  | 7.383  | 7.394  | 7.405  | 7.416  | 7.427  | 7.438  | 800   |
| 810        | 7.438  | 7.449  | 7.460  | 7.470  | 7.481  | 7.492  | 7.503  | 7.514  | 7.525  | 7.536  | 7.547  | 810   |
| 820        | 7.547  | 7.558  | 7.569  | 7.580  | 7.591  | 7.602  | 7.613  | 7.623  | 7.634  | 7.645  | 7.656  | 820   |
| 830        | 7.656  | 7.667  | 7.678  | 7.689  | 7.700  | 7.711  | 7.722  | 7.733  | 7.744  | 7.755  | 7.766  | 830   |
| 840        | 7.766  | 7.777  | 7.788  | 7.799  | 7.810  | 7.821  | 7.832  | 7.843  | 7.854  | 7.865  | 7.876  | 840   |
| 850        | 7.876  | 7.887  | 7.898  | 7.910  | 7.921  | 7.932  | 7.943  | 7.954  | 7.965  | 7.976  | 7.987  | 850   |
| 860        | 7.987  | 7.998  | 8.009  | 8.020  | 8.031  | 8.042  | 8.053  | 8.064  | 8.076  | 8.087  | 8.098  | 860   |
| 870        | 8.098  | 8.109  | 8.120  | 8.131  | 8.142  | 8.153  | 8.164  | 8.176  | 8.187  | 8.198  | 8.209  | 870   |
| 880        | 8.209  | 8.220  | 8.231  | 8.242  | 8.254  | 8.265  | 8.276  | 8.287  | 8.298  | 8.309  | 8.320  | 880   |
| 890        | 8.320  | 8.332  | 8.343  | 8.354  | 8.365  | 8.376  | 8.388  | 8.399  | 8.410  | 8.421  | 8.432  | 890   |
| 900        | 8.432  | 8.444  | 8.455  | 8.466  | 8.477  | 8.488  | 8.500  | 8.511  | 8.522  | 8.533  | 8.545  | 900   |
| 910        | 8.545  | 8.556  | 8.567  | 8.578  | 8.590  | 8.601  | 8.612  | 8.623  | 8.635  | 8.646  | 8.657  | 910   |
| 920        | 8.657  | 8.668  | 8.680  | 8.691  | 8.702  | 8.714  | 8.725  | 8.736  | 8.747  | 8.759  | 8.770  | 920   |
| 930        | 8.770  | 8.781  | 8.793  | 8.804  | 8.815  | 8.827  | 8.838  | 8.849  | 8.861  | 8.872  | 8.883  | 930   |
| 940        | 8.883  | 8.895  | 8.906  | 8.917  | 8.929  | 8.940  | 8.951  | 8.963  | 8.974  | 8.986  | 8.997  | 940   |
| 950        | 8.997  | 9.008  | 9.020  | 9.031  | 9.042  | 9.054  | 9.065  | 9.077  | 9.088  | 9.099  | 9.111  | 950   |
| 960        | 9.111  | 9.122  | 9.134  | 9.145  | 9.157  | 9.168  | 9.179  | 9.191  | 9.202  | 9.214  | 9.225  | 960   |
| 970        | 9.225  | 9.236  | 9.248  | 9.260  | 9.271  | 9.282  | 9.294  | 9.305  | 9.317  | 9.328  | 9.340  | 970   |
| 980        | 9.340  | 9.351  | 9.363  | 9.374  | 9.386  | 9.397  | 9.409  | 9.420  | 9.432  | 9.443  | 9.455  | 980   |
| 990        | 9.455  | 9.466  | 9.478  | 9.489  | 9.501  | 9.512  | 9.524  | 9.535  | 9.547  | 9.559  | 9.570  | 990   |
| 1,000      | 9.570  | 9.582  | 9.593  | 9.605  | 9.616  | 9.628  | 9.639  | 9.651  | 9.663  | 9.674  | 9.686  | 1,000 |
| 1,010      | 9.686  | 9.697  | 9.709  | 9.720  | 9.732  | 9.744  | 9.755  | 9.767  | 9.779  | 9.790  | 9.802  | 1,010 |
| 1,020      | 9.802  | 9.813  | 9.825  | 9.837  | 9.848  | 9.860  | 9.871  | 9.883  | 9.895  | 9.906  | 9.918  | 1,020 |
| 1,030      | 9.918  | 9.930  | 9.941  | 9.953  | 9.965  | 9.976  | 9.988  | 10.000 | 10.011 | 10.023 | 10.035 | 1,030 |
| 1,040      | 10.035 | 10.046 | 10.058 | 10.070 | 10.082 | 10.093 | 10.105 | 10.117 | 10.128 | 10.140 | 10.152 | 1,040 |
| 1,050      | 10.152 | 10.163 | 10.175 | 10.187 | 10.199 | 10.210 | 10.222 | 10.234 | 10.246 | 10.257 | 10.269 | 1,050 |
| 1,060      | 10.269 | 10.281 | 10.293 | 10.304 | 10.316 | 10.328 | 10.340 | 10.351 | 10.363 | 10.375 | 10.387 | 1,060 |
| 1,070      | 10.387 | 10.399 | 10.410 | 10.422 | 10.434 | 10.446 | 10.458 | 10.469 | 10.481 | 10.493 | 10.505 | 1,070 |
| 1,080      | 10.505 | 10.517 | 10.528 | 10.540 | 10.552 | 10.564 | 10.576 | 10.587 | 10.599 | 10.611 | 10.623 | 1,080 |
| 1,090      | 10.623 | 10.635 | 10.647 | 10.658 | 10.670 | 10.682 | 10.694 | 10.706 | 10.718 | 10.729 | 10.741 | 1,090 |
| 1,100      | 10.741 | 10.753 | 10.765 | 10.777 | 10.789 | 10.801 | 10.812 | 10.824 | 10.836 | 10.848 | 10.860 | 1,100 |
| 1,110      | 10.860 | 10.872 | 10.884 | 10.896 | 10.907 | 10.919 | 10.931 | 10.943 | 10.955 | 10.967 | 10.979 | 1,110 |
| 1,120      | 10.979 | 10.991 | 11.003 | 11.014 | 11.026 | 11.038 | 11.050 | 11.062 | 11.074 | 11.086 | 11.098 | 1,120 |
| 1,130      | 11.098 | 11.110 | 11.122 | 11.133 | 11.145 | 11.157 | 11.169 | 11.181 | 11.193 | 11.205 | 11.217 | 1,130 |
| 1,140      | 11.217 | 11.229 | 11.241 | 11.253 | 11.265 | 11.277 | 11.289 | 11.300 | 11.312 | 11.324 | 11.336 | 1,140 |
| 1,150      | 11.336 | 11.348 | 11.360 | 11.372 | 11.384 | 11.396 | 11.408 | 11.420 | 11.432 | 11.444 | 11.456 | 1,150 |
| 1,160      | 11.456 | 11.468 | 11.480 | 11.492 | 11.504 | 11.516 | 11.528 | 11.540 | 11.552 | 11.564 | 11.575 | 1,160 |
| 1,170      | 11.575 | 11.587 | 11.599 | 11.611 | 11.623 | 11.635 | 11.647 | 11.659 | 11.671 | 11.683 | 11.695 | 1,170 |
| 1,180      | 11.695 | 11.707 | 11.719 | 11.731 | 11.743 | 11.755 | 11.767 | 11.779 | 11.791 | 11.803 | 11.815 | 1,180 |
| 1,190      | 11.815 | 11.827 | 11.839 | 11.851 | 11.863 | 11.875 | 11.887 | 11.899 | 11.911 | 11.923 | 11.935 | 1,190 |
| 1,200      | 11.935 | 11.947 | 11.959 | 11.971 | 11.983 | 11.995 | 12.007 | 12.019 | 12.031 | 12.043 | 12.055 | 1,200 |
| °C         | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °C    |



Table 2. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| ° C                                                                                                      | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° C                                                                                                      |
|----------------------------------------------------------------------------------------------------------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------------------------------------------------------------------------------------------------------|
| 1, 200<br>1, 210<br>1, 220<br>1, 230<br><br>1, 240<br>1, 250<br>1, 260<br><br>1, 270<br>1, 280<br>1, 290 | Millivolts |         |         |         |         |         |         |         |         |         |         | 1, 200<br>1, 210<br>1, 220<br>1, 230<br><br>1, 240<br>1, 250<br>1, 260<br><br>1, 270<br>1, 280<br>1, 290 |
|                                                                                                          | 11. 935    | 11. 947 | 11. 959 | 11. 971 | 11. 983 | 11. 995 | 12. 007 | 12. 019 | 12. 031 | 12. 043 | 12. 055 |                                                                                                          |
|                                                                                                          | 12. 055    | 12. 067 | 12. 079 | 12. 091 | 12. 103 | 12. 115 | 12. 127 | 12. 139 | 12. 151 | 12. 163 | 12. 175 |                                                                                                          |
|                                                                                                          | 12. 175    | 12. 187 | 12. 200 | 12. 212 | 12. 224 | 12. 236 | 12. 248 | 12. 260 | 12. 272 | 12. 284 | 12. 296 |                                                                                                          |
|                                                                                                          | 12. 296    | 12. 308 | 12. 320 | 12. 332 | 12. 344 | 12. 356 | 12. 368 | 12. 380 | 12. 392 | 12. 404 | 12. 416 |                                                                                                          |
|                                                                                                          | 12. 416    | 12. 428 | 12. 440 | 12. 452 | 12. 464 | 12. 476 | 12. 488 | 12. 500 | 12. 512 | 12. 524 | 12. 536 |                                                                                                          |
|                                                                                                          | 12. 536    | 12. 548 | 12. 560 | 12. 573 | 12. 585 | 12. 597 | 12. 609 | 12. 621 | 12. 633 | 12. 645 | 12. 657 |                                                                                                          |
|                                                                                                          | 12. 657    | 12. 669 | 12. 681 | 12. 693 | 12. 705 | 12. 717 | 12. 729 | 12. 741 | 12. 753 | 12. 765 | 12. 777 |                                                                                                          |
|                                                                                                          | 12. 777    | 12. 789 | 12. 801 | 12. 813 | 12. 825 | 12. 837 | 12. 849 | 12. 861 | 12. 873 | 12. 885 | 12. 897 |                                                                                                          |
|                                                                                                          | 12. 897    | 12. 909 | 12. 921 | 12. 933 | 12. 945 | 12. 957 | 12. 969 | 12. 981 | 12. 993 | 13. 005 | 13. 018 |                                                                                                          |
|                                                                                                          | 13. 018    | 13. 030 | 13. 042 | 13. 054 | 13. 066 | 13. 078 | 13. 090 | 13. 102 | 13. 114 | 13. 126 | 13. 138 |                                                                                                          |
| 1, 300                                                                                                   | 13. 138    | 13. 150 | 13. 162 | 13. 174 | 13. 186 | 13. 198 | 13. 210 | 13. 222 | 13. 234 | 13. 246 | 13. 258 | 1, 300                                                                                                   |
| 1, 310                                                                                                   | 13. 258    | 13. 270 | 13. 282 | 13. 294 | 13. 306 | 13. 318 | 13. 330 | 13. 342 | 13. 354 | 13. 366 | 13. 378 | 1, 310                                                                                                   |
| 1, 320                                                                                                   | 13. 378    | 13. 390 | 13. 402 | 13. 414 | 13. 426 | 13. 438 | 13. 450 | 13. 462 | 13. 474 | 13. 486 | 13. 498 | 1, 320                                                                                                   |
| 1, 330                                                                                                   | 13. 498    | 13. 510 | 13. 522 | 13. 534 | 13. 546 | 13. 558 | 13. 570 | 13. 582 | 13. 594 | 13. 606 | 13. 618 | 1, 330                                                                                                   |
| 1, 340                                                                                                   | 13. 618    | 13. 630 | 13. 642 | 13. 654 | 13. 666 | 13. 678 | 13. 690 | 13. 702 | 13. 714 | 13. 726 | 13. 738 | 1, 340                                                                                                   |
| 1, 350                                                                                                   | 13. 738    | 13. 750 | 13. 762 | 13. 774 | 13. 786 | 13. 798 | 13. 810 | 13. 822 | 13. 834 | 13. 846 | 13. 858 | 1, 350                                                                                                   |
| 1, 360                                                                                                   | 13. 858    | 13. 870 | 13. 882 | 13. 894 | 13. 906 | 13. 918 | 13. 930 | 13. 942 | 13. 954 | 13. 966 | 13. 978 | 1, 360                                                                                                   |
| 1, 370                                                                                                   | 13. 978    | 13. 990 | 14. 002 | 14. 014 | 14. 026 | 14. 038 | 14. 050 | 14. 062 | 14. 074 | 14. 086 | 14. 098 | 1, 370                                                                                                   |
| 1, 380                                                                                                   | 14. 098    | 14. 110 | 14. 122 | 14. 133 | 14. 145 | 14. 157 | 14. 169 | 14. 181 | 14. 193 | 14. 205 | 14. 217 | 1, 380                                                                                                   |
| 1, 390                                                                                                   | 14. 217    | 14. 229 | 14. 241 | 14. 253 | 14. 265 | 14. 277 | 14. 289 | 14. 301 | 14. 313 | 14. 325 | 14. 337 | 1, 390                                                                                                   |
| 1, 400                                                                                                   | 14. 337    | 14. 349 | 14. 361 | 14. 373 | 14. 385 | 14. 397 | 14. 409 | 14. 421 | 14. 433 | 14. 445 | 14. 457 | 1, 400                                                                                                   |
| 1, 410                                                                                                   | 14. 457    | 14. 469 | 14. 481 | 14. 493 | 14. 504 | 14. 516 | 14. 528 | 14. 540 | 14. 552 | 14. 564 | 14. 576 | 1, 410                                                                                                   |
| 1, 420                                                                                                   | 14. 576    | 14. 588 | 14. 600 | 14. 612 | 14. 624 | 14. 636 | 14. 648 | 14. 660 | 14. 672 | 14. 684 | 14. 696 | 1, 420                                                                                                   |
| 1, 430                                                                                                   | 14. 696    | 14. 708 | 14. 720 | 14. 732 | 14. 744 | 14. 755 | 14. 767 | 14. 779 | 14. 791 | 14. 803 | 14. 815 | 1, 430                                                                                                   |
| 1, 440                                                                                                   | 14. 815    | 14. 827 | 14. 839 | 14. 851 | 14. 863 | 14. 875 | 14. 887 | 14. 899 | 14. 911 | 14. 923 | 14. 935 | 1, 440                                                                                                   |
| 1, 450                                                                                                   | 14. 935    | 14. 946 | 14. 958 | 14. 970 | 14. 982 | 14. 994 | 15. 006 | 15. 018 | 15. 030 | 15. 042 | 15. 054 | 1, 450                                                                                                   |
| 1, 460                                                                                                   | 15. 054    | 15. 066 | 15. 078 | 15. 090 | 15. 102 | 15. 113 | 15. 125 | 15. 137 | 15. 149 | 15. 161 | 15. 173 | 1, 460                                                                                                   |
| 1, 470                                                                                                   | 15. 173    | 15. 185 | 15. 197 | 15. 209 | 15. 221 | 15. 233 | 15. 245 | 15. 256 | 15. 268 | 15. 280 | 15. 292 | 1, 470                                                                                                   |
| 1, 480                                                                                                   | 15. 292    | 15. 304 | 15. 316 | 15. 328 | 15. 340 | 15. 352 | 15. 364 | 15. 376 | 15. 387 | 15. 399 | 15. 411 | 1, 480                                                                                                   |
| 1, 490                                                                                                   | 15. 411    | 15. 423 | 15. 435 | 15. 447 | 15. 459 | 15. 471 | 15. 483 | 15. 495 | 15. 507 | 15. 518 | 15. 530 | 1, 490                                                                                                   |
| 1, 500                                                                                                   | 15. 530    | 15. 542 | 15. 554 | 15. 566 | 15. 578 | 15. 590 | 15. 602 | 15. 614 | 15. 625 | 15. 637 | 15. 649 | 1, 500                                                                                                   |
| 1, 510                                                                                                   | 15. 649    | 15. 661 | 15. 673 | 15. 685 | 15. 697 | 15. 709 | 15. 721 | 15. 732 | 15. 744 | 15. 756 | 15. 768 | 1, 510                                                                                                   |
| 1, 520                                                                                                   | 15. 768    | 15. 780 | 15. 792 | 15. 804 | 15. 816 | 15. 827 | 15. 839 | 15. 851 | 15. 863 | 15. 875 | 15. 887 | 1, 520                                                                                                   |
| 1, 530                                                                                                   | 15. 887    | 15. 899 | 15. 911 | 15. 922 | 15. 934 | 15. 946 | 15. 958 | 15. 970 | 15. 982 | 15. 994 | 16. 006 | 1, 530                                                                                                   |
| 1, 540                                                                                                   | 16. 006    | 16. 017 | 16. 029 | 16. 041 | 16. 053 | 16. 065 | 16. 077 | 16. 089 | 16. 100 | 16. 112 | 16. 124 | 1, 540                                                                                                   |
| 1, 550                                                                                                   | 16. 124    | 16. 136 | 16. 148 | 16. 160 | 16. 171 | 16. 183 | 16. 195 | 16. 207 | 16. 219 | 16. 231 | 16. 243 | 1, 550                                                                                                   |
| 1, 560                                                                                                   | 16. 243    | 16. 254 | 16. 266 | 16. 278 | 16. 290 | 16. 302 | 16. 314 | 16. 325 | 16. 337 | 16. 349 | 16. 361 | 1, 560                                                                                                   |
| 1, 570                                                                                                   | 16. 361    | 16. 373 | 16. 385 | 16. 396 | 16. 408 | 16. 420 | 16. 432 | 16. 444 | 16. 456 | 16. 467 | 16. 479 | 1, 570                                                                                                   |
| 1, 580                                                                                                   | 16. 479    | 16. 491 | 16. 503 | 16. 515 | 16. 527 | 16. 538 | 16. 550 | 16. 562 | 16. 574 | 16. 586 | 16. 597 | 1, 580                                                                                                   |
| 1, 590                                                                                                   | 16. 597    | 16. 609 | 16. 621 | 16. 633 | 16. 645 | 16. 657 | 16. 668 | 16. 680 | 16. 692 | 16. 704 | 16. 716 | 1, 590                                                                                                   |
| 1, 600                                                                                                   | 16. 716    | 16. 727 | 16. 739 | 16. 751 | 16. 763 | 16. 775 | 16. 786 | 16. 798 | 16. 810 | 16. 822 | 16. 834 | 1, 600                                                                                                   |
| ° C                                                                                                      | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° C                                                                                                      |



**Table 2. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.****(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)**

| ° C           | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° C           |
|---------------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------------|
|               | Millivolts |         |         |         |         |         |         |         |         |         |         |               |
| <b>1, 600</b> | 16. 716    | 16. 727 | 16. 739 | 16. 751 | 16. 763 | 16. 775 | 16. 786 | 16. 798 | 16. 810 | 16. 822 | 16. 834 | <b>1, 600</b> |
| <b>1, 610</b> | 16. 834    | 16. 845 | 16. 857 | 16. 869 | 16. 881 | 16. 893 | 16. 904 | 16. 916 | 16. 928 | 16. 940 | 16. 952 | <b>1, 610</b> |
| <b>1, 620</b> | 16. 952    | 16. 963 | 16. 975 | 16. 987 | 16. 999 | 17. 010 | 17. 022 | 17. 034 | 17. 046 | 17. 058 | 17. 069 | <b>1, 620</b> |
| <b>1, 630</b> | 17. 069    | 17. 081 | 17. 093 | 17. 105 | 17. 116 | 17. 128 | 17. 140 | 17. 152 | 17. 163 | 17. 175 | 17. 187 | <b>1, 630</b> |
| <b>1, 640</b> | 17. 187    | 17. 199 | 17. 211 | 17. 222 | 17. 234 | 17. 246 | 17. 258 | 17. 269 | 17. 281 | 17. 293 | 17. 305 | <b>1, 640</b> |
| <b>1, 650</b> | 17. 305    | 17. 316 | 17. 328 | 17. 340 | 17. 352 | 17. 363 | 17. 375 | 17. 387 | 17. 398 | 17. 410 | 17. 422 | <b>1, 650</b> |
| <b>1, 660</b> | 17. 422    | 17. 434 | 17. 446 | 17. 457 | 17. 469 | 17. 481 | 17. 492 | 17. 504 | 17. 516 | 17. 528 | 17. 539 | <b>1, 660</b> |
| <b>1, 670</b> | 17. 539    | 17. 551 | 17. 563 | 17. 575 | 17. 586 | 17. 598 | 17. 610 | 17. 621 | 17. 633 | 17. 645 | 17. 657 | <b>1, 670</b> |
| <b>1, 680</b> | 17. 657    | 17. 668 | 17. 680 | 17. 692 | 17. 704 | 17. 715 | 17. 727 | 17. 739 | 17. 750 | 17. 762 | 17. 774 | <b>1, 680</b> |
| <b>1, 690</b> | 17. 774    | 17. 785 | 17. 797 | 17. 809 | 17. 821 | 17. 832 | 17. 844 | 17. 856 | 17. 867 | 17. 879 | 17. 891 | <b>1, 690</b> |
| <b>1, 700</b> | 17. 891    | 17. 902 | 17. 914 | 17. 926 | 17. 938 | 17. 949 | 17. 961 | 17. 973 | 17. 984 | 17. 996 | 18. 008 | <b>1, 700</b> |
| <b>1, 710</b> | 18. 008    | 18. 019 | 18. 031 | 18. 043 | 18. 054 | 18. 066 | 18. 078 | 18. 089 | 18. 101 | 18. 113 | 18. 124 | <b>1, 710</b> |
| <b>1, 720</b> | 18. 124    | 18. 136 | 18. 148 | 18. 159 | 18. 171 | 18. 183 | 18. 194 | 18. 206 | 18. 218 | 18. 229 | 18. 241 | <b>1, 720</b> |
| <b>1, 730</b> | 18. 241    | 18. 253 | 18. 264 | 18. 276 | 18. 288 | 18. 299 | 18. 311 | 18. 323 | 18. 334 | 18. 346 | 18. 358 | <b>1, 730</b> |
| <b>1, 740</b> | 18. 358    | 18. 369 | 18. 381 | 18. 393 | 18. 404 | 18. 416 | 18. 427 | 18. 439 | 18. 451 | 18. 462 | 18. 474 | <b>1, 740</b> |
| <b>1, 750</b> | 18. 474    | 18. 486 | 18. 497 | 18. 509 | 18. 520 | 18. 532 | 18. 544 | 18. 555 | 18. 567 | 18. 579 | 18. 590 | <b>1, 750</b> |
| <b>1, 760</b> | 18. 590    | 18. 602 | 18. 613 | 18. 625 | 18. 637 | 18. 648 | 18. 660 | 18. 672 | 18. 683 | 18. 695 | -----   | <b>1, 760</b> |
| ° C           | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° C           |

# Table 3. Platinum Versus Platinum-13-Percent Rhodium Thermocouples

Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0°C.)

| Millivolts | .000      | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts |
|------------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| 0.000      | Degrees C |       |       |       |       |       |       |       |       |       |       | 0.000      |
|            | 0.0       | 1.9   | 3.7   | 5.6   | 7.4   | 9.1   | 10.9  | 12.7  | 14.4  | 16.2  | 17.9  |            |
| .100       | 17.9      | 19.6  | 21.3  | 23.0  | 24.7  | 26.4  | 28.0  | 29.7  | 31.3  | 33.0  | 34.6  | .100       |
| .200       | 34.6      | 36.2  | 37.8  | 39.4  | 41.0  | 42.6  | 44.2  | 45.7  | 47.3  | 48.8  | 50.4  | .200       |
| .300       | 50.4      | 51.9  | 53.5  | 55.0  | 56.5  | 58.0  | 59.5  | 61.0  | 62.5  | 64.0  | 65.5  | .300       |
| .400       | 65.5      | 67.0  | 68.4  | 69.9  | 71.3  | 72.8  | 74.2  | 75.7  | 77.1  | 78.6  | 80.0  | .400       |
| .500       | 80.0      | 81.4  | 82.8  | 84.2  | 85.6  | 87.0  | 88.4  | 89.7  | 91.1  | 92.5  | 93.9  | .500       |
| .600       | 93.9      | 95.2  | 96.6  | 97.9  | 99.3  | 100.6 | 102.0 | 103.3 | 104.6 | 106.0 | 107.3 | .600       |
| .700       | 107.3     | 108.6 | 109.9 | 111.2 | 112.5 | 113.8 | 115.1 | 116.4 | 117.7 | 119.0 | 120.3 | .700       |
| .800       | 120.3     | 121.6 | 122.8 | 124.1 | 125.4 | 126.6 | 127.9 | 129.1 | 130.4 | 131.6 | 132.9 | .800       |
| .900       | 132.9     | 134.1 | 135.4 | 136.6 | 137.8 | 139.1 | 140.3 | 141.5 | 142.8 | 144.0 | 145.3 | .900       |
| 1.000      | 145.3     | 146.5 | 147.7 | 148.9 | 150.1 | 151.4 | 152.6 | 153.8 | 155.0 | 156.2 | 157.5 | 1.000      |
| 1.100      | 157.5     | 158.7 | 159.9 | 161.1 | 162.3 | 163.5 | 164.7 | 165.9 | 167.1 | 168.3 | 169.5 | 1.100      |
| 1.200      | 169.5     | 170.6 | 171.8 | 173.0 | 174.1 | 175.3 | 176.5 | 177.6 | 178.8 | 180.0 | 181.2 | 1.200      |
| 1.300      | 181.2     | 182.3 | 183.5 | 184.6 | 185.8 | 186.9 | 188.1 | 189.2 | 190.3 | 191.5 | 192.6 | 1.300      |
| 1.400      | 192.6     | 193.8 | 194.9 | 196.1 | 197.2 | 198.3 | 199.5 | 200.6 | 201.8 | 202.9 | 204.0 | 1.400      |
| 1.500      | 204.0     | 205.2 | 206.3 | 207.4 | 208.5 | 209.6 | 210.8 | 211.9 | 213.0 | 214.1 | 215.2 | 1.500      |
| 1.600      | 215.2     | 216.4 | 217.5 | 218.6 | 219.7 | 220.8 | 221.9 | 223.0 | 224.1 | 225.2 | 226.3 | 1.600      |
| 1.700      | 226.3     | 227.4 | 228.5 | 229.6 | 230.7 | 231.8 | 232.9 | 234.0 | 235.1 | 236.2 | 237.2 | 1.700      |
| 1.800      | 237.2     | 238.3 | 239.4 | 240.5 | 241.6 | 242.6 | 243.7 | 244.8 | 245.9 | 247.0 | 248.0 | 1.800      |
| 1.900      | 248.0     | 249.1 | 250.2 | 251.2 | 252.3 | 253.4 | 254.5 | 255.5 | 256.6 | 257.7 | 258.7 | 1.900      |
| 2.000      | 258.7     | 259.8 | 260.8 | 261.9 | 263.0 | 264.0 | 265.1 | 266.1 | 267.2 | 268.3 | 269.3 | 2.000      |
| 2.100      | 269.3     | 270.4 | 271.4 | 272.5 | 273.5 | 274.6 | 275.6 | 276.7 | 277.7 | 278.8 | 279.8 | 2.100      |
| 2.200      | 279.8     | 280.9 | 281.9 | 282.9 | 284.0 | 285.0 | 286.1 | 287.1 | 288.1 | 289.2 | 290.2 | 2.200      |
| 2.300      | 290.2     | 291.2 | 292.3 | 293.3 | 294.3 | 295.4 | 296.4 | 297.4 | 298.5 | 299.5 | 300.5 | 2.300      |
| 2.400      | 300.5     | 301.5 | 302.6 | 303.6 | 304.6 | 305.6 | 306.6 | 307.7 | 308.7 | 309.7 | 310.7 | 2.400      |
| 2.500      | 310.7     | 311.7 | 312.8 | 313.8 | 314.8 | 315.8 | 316.8 | 317.8 | 318.9 | 319.9 | 320.9 | 2.500      |
| 2.600      | 320.9     | 321.9 | 322.9 | 323.9 | 324.9 | 326.0 | 327.0 | 328.0 | 329.0 | 330.0 | 331.0 | 2.600      |
| 2.700      | 331.0     | 332.0 | 333.0 | 334.0 | 335.0 | 336.0 | 337.0 | 338.0 | 339.0 | 340.0 | 341.0 | 2.700      |
| 2.800      | 341.0     | 342.0 | 343.0 | 344.0 | 345.0 | 346.0 | 347.0 | 348.0 | 349.0 | 350.0 | 351.0 | 2.800      |
| 2.900      | 351.0     | 352.0 | 353.0 | 354.0 | 355.0 | 356.0 | 356.9 | 357.9 | 358.9 | 359.9 | 360.9 | 2.900      |
| 3.000      | 360.9     | 361.9 | 362.9 | 363.9 | 364.9 | 365.9 | 366.8 | 367.8 | 368.8 | 369.8 | 370.8 | 3.000      |
| 3.100      | 370.8     | 371.8 | 372.8 | 373.7 | 374.7 | 375.7 | 376.7 | 377.7 | 378.7 | 379.6 | 380.6 | 3.100      |
| 3.200      | 380.6     | 381.6 | 382.6 | 383.6 | 384.5 | 385.5 | 386.5 | 387.5 | 388.4 | 389.4 | 390.4 | 3.200      |
| 3.300      | 390.4     | 391.4 | 392.3 | 393.3 | 394.3 | 395.2 | 396.2 | 397.2 | 398.2 | 399.1 | 400.1 | 3.300      |
| 3.400      | 400.1     | 401.1 | 402.0 | 403.0 | 404.0 | 404.9 | 405.9 | 406.9 | 407.9 | 408.8 | 409.8 | 3.400      |
| 3.500      | 409.8     | 410.8 | 411.7 | 412.7 | 413.6 | 414.6 | 415.6 | 416.5 | 417.5 | 418.4 | 419.4 | 3.500      |
| 3.600      | 419.4     | 420.3 | 421.3 | 422.3 | 423.2 | 424.2 | 425.1 | 426.1 | 427.0 | 428.0 | 428.9 | 3.600      |
| 3.700      | 428.9     | 429.9 | 430.8 | 431.8 | 432.7 | 433.7 | 434.6 | 435.6 | 436.5 | 437.5 | 438.4 | 3.700      |
| 3.800      | 438.4     | 439.4 | 440.3 | 441.3 | 442.2 | 443.2 | 444.1 | 445.0 | 446.0 | 446.9 | 447.9 | 3.800      |
| 3.900      | 447.9     | 448.8 | 449.8 | 450.7 | 451.6 | 452.6 | 453.5 | 454.5 | 455.4 | 456.3 | 457.3 | 3.900      |
| 4.000      | 457.3     | 458.2 | 459.2 | 460.1 | 461.1 | 462.0 | 463.0 | 463.9 | 464.9 | 465.8 | 466.8 | 4.000      |
| Millivolts | .000      | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts |

# Table 3. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.

| Millivolts | .000  | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| Degrees C  |       |       |       |       |       |       |       |       |       |       |       |            |
| 4.000      | 457.3 | 458.2 | 459.2 | 460.1 | 461.1 | 462.0 | 463.0 | 463.9 | 464.9 | 465.8 | 466.8 | 4.000      |
| 4.100      | 466.8 | 467.7 | 468.7 | 469.6 | 470.5 | 471.5 | 472.4 | 473.4 | 474.3 | 475.3 | 476.2 | 4.100      |
| 4.200      | 476.2 | 477.1 | 478.1 | 479.0 | 479.9 | 480.9 | 481.8 | 482.8 | 483.7 | 484.6 | 485.6 | 4.200      |
| 4.300      | 485.6 | 486.5 | 487.4 | 488.4 | 489.3 | 490.2 | 491.2 | 492.1 | 493.0 | 494.0 | 494.9 | 4.300      |
| 4.400      | 494.9 | 495.8 | 496.8 | 497.7 | 498.6 | 499.5 | 500.5 | 501.4 | 502.3 | 503.2 | 504.2 | 4.400      |
| 4.500      | 504.2 | 505.1 | 506.0 | 506.9 | 507.8 | 508.8 | 509.7 | 510.6 | 511.5 | 512.4 | 513.4 | 4.500      |
| 4.600      | 513.4 | 514.3 | 515.2 | 516.1 | 517.0 | 517.9 | 518.8 | 519.8 | 520.7 | 521.6 | 522.5 | 4.600      |
| 4.700      | 522.5 | 523.4 | 524.3 | 525.2 | 526.1 | 527.1 | 528.0 | 528.9 | 529.8 | 530.7 | 531.6 | 4.700      |
| 4.800      | 531.6 | 532.5 | 533.4 | 534.3 | 535.2 | 536.1 | 537.0 | 538.0 | 538.9 | 539.8 | 540.7 | 4.800      |
| 4.900      | 540.7 | 541.6 | 542.5 | 543.4 | 544.3 | 545.2 | 546.1 | 547.0 | 547.9 | 548.8 | 549.7 | 4.900      |
| 5.000      | 549.7 | 550.6 | 551.5 | 552.4 | 553.3 | 554.2 | 555.1 | 556.0 | 556.9 | 557.8 | 558.7 | 5.000      |
| 5.100      | 558.7 | 559.6 | 560.5 | 561.4 | 562.3 | 563.2 | 564.1 | 564.9 | 565.8 | 566.7 | 567.6 | 5.100      |
| 5.200      | 567.6 | 568.5 | 569.4 | 570.3 | 571.2 | 572.1 | 573.0 | 573.9 | 574.8 | 575.7 | 576.6 | 5.200      |
| 5.300      | 576.6 | 577.5 | 578.4 | 579.3 | 580.2 | 581.1 | 582.0 | 582.9 | 583.8 | 584.6 | 585.5 | 5.300      |
| 5.400      | 585.5 | 586.4 | 587.3 | 588.2 | 589.1 | 590.0 | 590.9 | 591.8 | 592.7 | 593.5 | 594.4 | 5.400      |
| 5.500      | 594.4 | 595.3 | 596.2 | 597.1 | 598.0 | 598.9 | 599.7 | 600.6 | 601.5 | 602.4 | 603.2 | 5.500      |
| 5.600      | 603.2 | 604.1 | 605.0 | 605.9 | 606.8 | 607.6 | 608.5 | 609.4 | 610.3 | 611.2 | 612.0 | 5.600      |
| 5.700      | 612.0 | 612.9 | 613.8 | 614.6 | 615.5 | 616.4 | 617.2 | 618.1 | 619.0 | 619.8 | 620.7 | 5.700      |
| 5.800      | 620.7 | 621.6 | 622.5 | 623.3 | 624.2 | 625.1 | 625.9 | 626.8 | 627.7 | 628.6 | 629.4 | 5.800      |
| 5.900      | 629.4 | 630.3 | 631.2 | 632.0 | 632.9 | 633.8 | 634.6 | 635.5 | 636.4 | 637.2 | 638.1 | 5.900      |
| 6.000      | 638.1 | 639.0 | 639.8 | 640.7 | 641.6 | 642.5 | 643.3 | 644.2 | 645.1 | 645.9 | 646.8 | 6.000      |
| 6.100      | 646.8 | 647.7 | 648.5 | 649.4 | 650.3 | 651.1 | 652.0 | 652.9 | 653.7 | 654.6 | 655.5 | 6.100      |
| 6.200      | 655.5 | 656.3 | 657.2 | 658.1 | 659.0 | 659.8 | 660.7 | 661.5 | 662.4 | 663.3 | 664.1 | 6.200      |
| 6.300      | 664.1 | 665.0 | 665.9 | 666.7 | 667.6 | 668.5 | 669.3 | 670.2 | 671.0 | 671.9 | 672.7 | 6.300      |
| 6.400      | 672.7 | 673.6 | 674.5 | 675.3 | 676.2 | 677.0 | 677.9 | 678.7 | 679.6 | 680.4 | 681.3 | 6.400      |
| 6.500      | 681.3 | 682.2 | 683.0 | 683.8 | 684.7 | 685.5 | 686.4 | 687.3 | 688.1 | 689.0 | 689.8 | 6.500      |
| 6.600      | 689.8 | 690.7 | 691.5 | 692.4 | 693.2 | 694.1 | 694.9 | 695.8 | 696.6 | 697.5 | 698.3 | 6.600      |
| 6.700      | 698.3 | 699.2 | 700.0 | 700.8 | 701.7 | 702.5 | 703.4 | 704.2 | 705.1 | 705.9 | 706.8 | 6.700      |
| 6.800      | 706.8 | 707.6 | 708.5 | 709.3 | 710.1 | 711.0 | 711.8 | 712.7 | 713.5 | 714.3 | 715.2 | 6.800      |
| 6.900      | 715.2 | 716.0 | 716.9 | 717.7 | 718.6 | 719.4 | 720.2 | 721.1 | 721.9 | 722.8 | 723.6 | 6.900      |
| 7.000      | 723.6 | 724.5 | 725.3 | 726.1 | 727.0 | 727.8 | 728.7 | 729.5 | 730.3 | 731.2 | 732.0 | 7.000      |
| 7.100      | 732.0 | 732.9 | 733.7 | 734.5 | 735.4 | 736.2 | 737.1 | 737.9 | 738.7 | 739.6 | 740.4 | 7.100      |
| 7.200      | 740.4 | 741.3 | 742.1 | 742.9 | 743.8 | 744.6 | 745.4 | 746.3 | 747.1 | 747.9 | 748.7 | 7.200      |
| 7.300      | 748.7 | 749.6 | 750.4 | 751.2 | 752.1 | 752.9 | 753.7 | 754.5 | 755.3 | 756.2 | 757.0 | 7.300      |
| 7.400      | 757.0 | 757.9 | 758.7 | 759.5 | 760.3 | 761.2 | 762.0 | 762.8 | 763.6 | 764.5 | 765.3 | 7.400      |
| 7.500      | 765.3 | 766.1 | 766.9 | 767.7 | 768.6 | 769.4 | 770.2 | 771.0 | 771.8 | 772.7 | 773.5 | 7.500      |
| 7.600      | 773.5 | 774.3 | 775.1 | 775.9 | 776.8 | 777.6 | 778.4 | 779.2 | 780.1 | 780.9 | 781.7 | 7.600      |
| 7.700      | 781.7 | 782.5 | 783.3 | 784.2 | 785.0 | 785.8 | 786.6 | 787.4 | 788.3 | 789.1 | 789.9 | 7.700      |
| 7.800      | 789.9 | 790.7 | 791.5 | 792.3 | 793.2 | 794.0 | 794.8 | 795.6 | 796.4 | 797.2 | 798.0 | 7.800      |
| 7.900      | 798.0 | 798.9 | 799.7 | 800.5 | 801.3 | 802.1 | 802.9 | 803.7 | 804.6 | 805.4 | 806.2 | 7.900      |
| 8.000      | 806.2 | 807.0 | 807.8 | 808.6 | 809.4 | 810.2 | 811.1 | 811.9 | 812.7 | 813.5 | 814.3 | 8.000      |
| Millivolts | .000  | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts |



**Table 3. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**  
 (Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts | .000   | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|
| Degrees C  |        |        |        |        |        |        |        |        |        |        |        |            |
| 8.000      | 806.2  | 807.0  | 807.8  | 808.6  | 809.4  | 810.2  | 811.1  | 811.9  | 812.7  | 813.5  | 814.3  |            |
| 8.100      | 814.3  | 815.1  | 815.9  | 816.7  | 817.5  | 818.4  | 819.2  | 820.0  | 820.8  | 821.6  | 822.4  |            |
| 8.200      | 822.4  | 823.2  | 824.0  | 824.8  | 825.6  | 826.4  | 827.2  | 828.1  | 828.9  | 829.7  | 830.5  |            |
| 8.300      | 830.5  | 831.3  | 832.1  | 832.9  | 833.7  | 834.5  | 835.3  | 836.1  | 836.9  | 837.7  | 838.5  |            |
| 8.400      | 838.5  | 839.3  | 840.1  | 840.9  | 841.7  | 842.5  | 843.3  | 844.1  | 844.9  | 845.7  | 846.5  |            |
| 8.500      | 846.5  | 847.3  | 848.1  | 848.9  | 849.7  | 850.5  | 851.3  | 852.1  | 852.9  | 853.7  | 854.5  |            |
| 8.600      | 854.5  | 855.3  | 856.1  | 856.9  | 857.7  | 858.5  | 859.3  | 860.1  | 860.9  | 861.7  | 862.5  |            |
| 8.700      | 862.5  | 863.3  | 864.1  | 864.9  | 865.7  | 866.5  | 867.3  | 868.1  | 868.9  | 869.7  | 870.5  |            |
| 8.800      | 870.5  | 871.2  | 872.0  | 872.8  | 873.6  | 874.4  | 875.2  | 876.0  | 876.8  | 877.6  | 878.4  |            |
| 8.900      | 878.4  | 879.2  | 879.9  | 880.7  | 881.5  | 882.3  | 883.1  | 883.9  | 884.7  | 885.5  | 886.3  |            |
| 9.000      | 886.3  | 887.1  | 887.9  | 888.6  | 889.4  | 890.2  | 891.0  | 891.8  | 892.6  | 893.4  | 894.2  |            |
| 9.100      | 894.2  | 894.9  | 895.7  | 896.5  | 897.3  | 898.1  | 898.9  | 899.6  | 900.4  | 901.2  | 902.0  |            |
| 9.200      | 902.0  | 902.8  | 903.6  | 904.3  | 905.1  | 905.9  | 906.7  | 907.5  | 908.2  | 909.0  | 909.8  |            |
| 9.300      | 909.8  | 910.6  | 911.4  | 912.2  | 912.9  | 913.7  | 914.5  | 915.3  | 916.1  | 916.8  | 917.6  |            |
| 9.400      | 917.6  | 918.4  | 919.2  | 920.0  | 920.7  | 921.5  | 922.3  | 923.1  | 923.9  | 924.6  | 925.4  |            |
| 9.500      | 925.4  | 926.2  | 927.0  | 927.8  | 928.5  | 929.3  | 930.1  | 930.9  | 931.6  | 932.4  | 933.2  |            |
| 9.600      | 933.2  | 934.0  | 934.8  | 935.5  | 936.3  | 937.1  | 937.9  | 938.7  | 939.4  | 940.2  | 941.0  |            |
| 9.700      | 941.0  | 941.8  | 942.5  | 943.3  | 944.1  | 944.9  | 945.6  | 946.4  | 947.2  | 948.0  | 948.8  |            |
| 9.800      | 948.8  | 949.5  | 950.3  | 951.1  | 951.9  | 952.6  | 953.4  | 954.2  | 954.9  | 955.7  | 956.5  |            |
| 9.900      | 956.5  | 957.2  | 958.0  | 958.8  | 959.5  | 960.3  | 961.0  | 961.8  | 962.6  | 963.4  | 964.1  |            |
| 10.000     | 964.1  | 964.9  | 965.6  | 966.4  | 967.2  | 967.9  | 968.7  | 969.5  | 970.2  | 971.0  | 971.8  | 10.000     |
| 10.100     | 971.8  | 972.5  | 973.3  | 974.0  | 974.8  | 975.6  | 976.3  | 977.1  | 977.9  | 978.6  | 979.4  | 10.100     |
| 10.200     | 979.4  | 980.2  | 980.9  | 981.7  | 982.4  | 983.2  | 984.0  | 984.7  | 985.5  | 986.3  | 987.0  | 10.200     |
| 10.300     | 987.0  | 987.8  | 988.5  | 989.3  | 990.1  | 990.8  | 991.6  | 992.3  | 993.1  | 993.9  | 994.6  | 10.300     |
| 10.400     | 994.6  | 995.4  | 996.1  | 996.9  | 997.7  | 998.4  | 999.2  | 999.9  | 1000.7 | 1001.5 | 1002.2 | 10.400     |
| 10.500     | 1002.2 | 1003.0 | 1003.7 | 1004.5 | 1005.3 | 1006.0 | 1006.8 | 1007.5 | 1008.3 | 1009.1 | 1009.8 | 10.500     |
| 10.600     | 1009.8 | 1010.6 | 1011.3 | 1012.1 | 1012.8 | 1013.6 | 1014.4 | 1015.1 | 1015.9 | 1016.6 | 1017.4 | 10.600     |
| 10.700     | 1017.4 | 1018.1 | 1018.9 | 1019.6 | 1020.4 | 1021.1 | 1021.9 | 1022.6 | 1023.4 | 1024.1 | 1024.9 | 10.700     |
| 10.800     | 1024.9 | 1025.6 | 1026.4 | 1027.1 | 1027.9 | 1028.6 | 1029.4 | 1030.1 | 1030.8 | 1031.6 | 1032.3 | 10.800     |
| 10.900     | 1032.3 | 1033.1 | 1033.8 | 1034.6 | 1035.3 | 1036.1 | 1036.8 | 1037.6 | 1038.3 | 1039.1 | 1039.8 | 10.900     |
| 11.000     | 1039.8 | 1040.6 | 1041.3 | 1042.0 | 1042.8 | 1043.5 | 1044.2 | 1045.0 | 1045.7 | 1046.4 | 1047.2 | 11.000     |
| 11.100     | 1047.2 | 1047.9 | 1048.7 | 1049.4 | 1050.2 | 1050.9 | 1051.6 | 1052.4 | 1053.1 | 1053.9 | 1054.6 | 11.100     |
| 11.200     | 1054.6 | 1055.4 | 1056.1 | 1056.8 | 1057.6 | 1058.3 | 1059.1 | 1059.8 | 1060.5 | 1061.3 | 1062.0 | 11.200     |
| 11.300     | 1062.0 | 1062.8 | 1063.5 | 1064.2 | 1065.0 | 1065.7 | 1066.4 | 1067.2 | 1067.9 | 1068.7 | 1069.4 | 11.300     |
| 11.400     | 1069.4 | 1070.1 | 1070.9 | 1071.6 | 1072.3 | 1073.1 | 1073.8 | 1074.5 | 1075.3 | 1076.0 | 1076.7 | 11.400     |
| 11.500     | 1076.7 | 1077.5 | 1078.2 | 1078.9 | 1079.7 | 1080.4 | 1081.1 | 1081.9 | 1082.6 | 1083.3 | 1084.1 | 11.500     |
| 11.600     | 1084.1 | 1084.8 | 1085.5 | 1086.3 | 1087.0 | 1087.7 | 1088.5 | 1089.2 | 1089.9 | 1090.7 | 1091.4 | 11.600     |
| 11.700     | 1091.4 | 1092.1 | 1092.9 | 1093.6 | 1094.3 | 1095.1 | 1095.8 | 1096.5 | 1097.3 | 1098.0 | 1098.7 | 11.700     |
| 11.800     | 1098.7 | 1099.5 | 1100.2 | 1101.0 | 1101.7 | 1102.4 | 1103.2 | 1103.9 | 1104.6 | 1105.4 | 1106.1 | 11.800     |
| 11.900     | 1106.1 | 1106.8 | 1107.6 | 1108.3 | 1109.0 | 1109.7 | 1110.5 | 1111.2 | 1111.9 | 1112.7 | 1113.4 | 11.900     |
| 12.000     | 1113.4 | 1114.1 | 1114.9 | 1115.6 | 1116.3 | 1117.1 | 1117.8 | 1118.5 | 1119.2 | 1120.0 | 1120.7 | 12.000     |
| Millivolts | .000   | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |

# Table 3. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------|
| Degrees C  |         |         |         |         |         |         |         |         |         |         |         |            |
| 12. 000    | 1113. 4 | 1114. 1 | 1114. 9 | 1115. 6 | 1116. 3 | 1117. 1 | 1117. 8 | 1118. 5 | 1119. 2 | 1120. 0 | 1120. 7 | 12. 000    |
| 12. 100    | 1120. 7 | 1121. 4 | 1122. 2 | 1122. 9 | 1123. 6 | 1124. 4 | 1125. 1 | 1125. 8 | 1126. 5 | 1127. 3 | 1128. 0 | 12. 100    |
| 12. 200    | 1128. 0 | 1128. 7 | 1129. 5 | 1130. 2 | 1130. 9 | 1131. 7 | 1132. 4 | 1133. 1 | 1133. 8 | 1134. 6 | 1135. 3 | 12. 200    |
| 12. 300    | 1135. 3 | 1136. 0 | 1136. 8 | 1137. 5 | 1138. 2 | 1138. 9 | 1139. 7 | 1140. 4 | 1141. 1 | 1141. 9 | 1142. 6 | 12. 300    |
| 12. 400    | 1142. 6 | 1143. 3 | 1144. 0 | 1144. 8 | 1145. 5 | 1146. 2 | 1146. 9 | 1147. 6 | 1148. 4 | 1149. 1 | 1149. 8 | 12. 400    |
| 12. 500    | 1149. 8 | 1150. 5 | 1151. 3 | 1152. 0 | 1152. 7 | 1153. 4 | 1154. 2 | 1154. 9 | 1155. 6 | 1156. 4 | 1157. 1 | 12. 500    |
| 12. 600    | 1157. 1 | 1157. 8 | 1158. 5 | 1159. 3 | 1160. 0 | 1160. 7 | 1161. 4 | 1162. 2 | 1162. 9 | 1163. 6 | 1164. 3 | 12. 600    |
| 12. 700    | 1164. 3 | 1165. 0 | 1165. 8 | 1166. 5 | 1167. 2 | 1167. 9 | 1168. 7 | 1169. 4 | 1170. 1 | 1170. 8 | 1171. 5 | 12. 700    |
| 12. 800    | 1171. 5 | 1172. 3 | 1173. 0 | 1173. 7 | 1174. 4 | 1175. 2 | 1175. 9 | 1176. 6 | 1177. 3 | 1178. 1 | 1178. 8 | 12. 800    |
| 12. 900    | 1178. 8 | 1179. 5 | 1180. 2 | 1180. 9 | 1181. 7 | 1182. 4 | 1183. 1 | 1183. 8 | 1184. 6 | 1185. 3 | 1186. 0 | 12. 900    |
| 13. 000    | 1186. 0 | 1186. 7 | 1187. 5 | 1188. 2 | 1188. 9 | 1189. 6 | 1190. 3 | 1191. 1 | 1191. 8 | 1192. 5 | 1193. 2 | 13. 000    |
| 13. 100    | 1193. 2 | 1194. 0 | 1194. 7 | 1195. 4 | 1196. 1 | 1196. 9 | 1197. 6 | 1198. 3 | 1199. 0 | 1199. 7 | 1200. 5 | 13. 100    |
| 13. 200    | 1200. 5 | 1201. 2 | 1201. 9 | 1202. 6 | 1203. 3 | 1204. 1 | 1204. 8 | 1205. 5 | 1206. 2 | 1207. 0 | 1207. 7 | 13. 200    |
| 13. 300    | 1207. 7 | 1208. 4 | 1209. 1 | 1209. 8 | 1210. 6 | 1211. 3 | 1212. 0 | 1212. 7 | 1213. 4 | 1214. 2 | 1214. 9 | 13. 300    |
| 13. 400    | 1214. 9 | 1215. 6 | 1216. 3 | 1217. 1 | 1217. 8 | 1218. 5 | 1219. 2 | 1219. 9 | 1220. 7 | 1221. 4 | 1222. 1 | 13. 400    |
| 13. 500    | 1222. 1 | 1222. 8 | 1223. 5 | 1224. 3 | 1225. 0 | 1225. 7 | 1226. 4 | 1227. 1 | 1227. 9 | 1228. 6 | 1229. 3 | 13. 500    |
| 13. 600    | 1229. 3 | 1230. 0 | 1230. 7 | 1231. 5 | 1232. 2 | 1232. 9 | 1233. 6 | 1234. 3 | 1235. 1 | 1235. 8 | 1236. 5 | 13. 600    |
| 13. 700    | 1236. 5 | 1237. 2 | 1237. 9 | 1238. 6 | 1239. 4 | 1240. 1 | 1240. 8 | 1241. 5 | 1242. 2 | 1243. 0 | 1243. 7 | 13. 700    |
| 13. 800    | 1243. 7 | 1244. 4 | 1245. 1 | 1245. 8 | 1246. 6 | 1247. 3 | 1248. 0 | 1248. 7 | 1249. 4 | 1250. 2 | 1250. 9 | 13. 800    |
| 13. 900    | 1250. 9 | 1251. 6 | 1252. 3 | 1253. 0 | 1253. 8 | 1254. 5 | 1255. 2 | 1255. 9 | 1256. 6 | 1257. 4 | 1258. 1 | 13. 900    |
| 14. 000    | 1258. 1 | 1258. 7 | 1259. 5 | 1260. 2 | 1261. 0 | 1261. 7 | 1262. 4 | 1263. 1 | 1263. 8 | 1264. 6 | 1265. 3 | 14. 000    |
| 14. 100    | 1265. 3 | 1266. 0 | 1266. 7 | 1267. 4 | 1268. 2 | 1268. 9 | 1269. 6 | 1270. 3 | 1271. 1 | 1271. 8 | 1272. 5 | 14. 100    |
| 14. 200    | 1272. 5 | 1273. 2 | 1273. 9 | 1274. 6 | 1275. 4 | 1276. 1 | 1276. 8 | 1277. 5 | 1278. 3 | 1279. 0 | 1279. 7 | 14. 200    |
| 14. 300    | 1279. 7 | 1280. 4 | 1281. 1 | 1281. 8 | 1282. 6 | 1283. 3 | 1284. 0 | 1284. 7 | 1285. 5 | 1286. 2 | 1286. 9 | 14. 300    |
| 14. 400    | 1286. 9 | 1287. 6 | 1288. 3 | 1289. 0 | 1289. 7 | 1290. 5 | 1291. 2 | 1291. 9 | 1292. 6 | 1293. 3 | 1294. 1 | 14. 400    |
| 14. 500    | 1294. 1 | 1294. 8 | 1295. 5 | 1296. 2 | 1296. 9 | 1297. 7 | 1298. 4 | 1299. 1 | 1299. 8 | 1300. 5 | 1301. 3 | 14. 500    |
| 14. 600    | 1301. 3 | 1302. 0 | 1302. 7 | 1303. 4 | 1304. 1 | 1304. 8 | 1305. 6 | 1306. 3 | 1307. 0 | 1307. 7 | 1308. 5 | 14. 600    |
| 14. 700    | 1308. 5 | 1309. 2 | 1309. 9 | 1310. 6 | 1311. 3 | 1312. 1 | 1312. 8 | 1313. 5 | 1314. 2 | 1314. 9 | 1315. 7 | 14. 700    |
| 14. 800    | 1315. 7 | 1316. 4 | 1317. 1 | 1317. 8 | 1318. 5 | 1319. 3 | 1320. 0 | 1320. 7 | 1321. 4 | 1322. 1 | 1322. 9 | 14. 800    |
| 14. 900    | 1322. 9 | 1323. 6 | 1324. 3 | 1325. 0 | 1325. 8 | 1326. 5 | 1327. 2 | 1327. 9 | 1328. 6 | 1329. 4 | 1330. 1 | 14. 900    |
| 15. 000    | 1330. 1 | 1330. 8 | 1331. 5 | 1332. 3 | 1333. 0 | 1333. 7 | 1334. 4 | 1335. 1 | 1335. 9 | 1336. 6 | 1337. 3 | 15. 000    |
| 15. 100    | 1337. 3 | 1338. 0 | 1338. 7 | 1339. 5 | 1340. 2 | 1340. 9 | 1341. 6 | 1342. 3 | 1343. 1 | 1343. 8 | 1344. 5 | 15. 100    |
| 15. 200    | 1344. 5 | 1345. 2 | 1345. 9 | 1346. 7 | 1347. 4 | 1348. 1 | 1348. 8 | 1349. 6 | 1350. 3 | 1351. 0 | 1351. 7 | 15. 200    |
| 15. 300    | 1351. 7 | 1352. 4 | 1353. 2 | 1353. 9 | 1354. 6 | 1355. 3 | 1356. 0 | 1356. 8 | 1357. 5 | 1358. 2 | 1358. 9 | 15. 300    |
| 15. 400    | 1358. 9 | 1359. 7 | 1360. 4 | 1361. 1 | 1361. 8 | 1362. 5 | 1363. 3 | 1364. 0 | 1364. 7 | 1365. 4 | 1366. 1 | 15. 400    |
| 15. 500    | 1366. 1 | 1366. 9 | 1367. 6 | 1368. 3 | 1369. 0 | 1369. 7 | 1370. 5 | 1371. 2 | 1371. 9 | 1372. 6 | 1373. 4 | 15. 500    |
| 15. 600    | 1373. 4 | 1374. 1 | 1374. 8 | 1375. 5 | 1376. 2 | 1377. 0 | 1377. 7 | 1378. 4 | 1379. 1 | 1379. 8 | 1380. 6 | 15. 600    |
| 15. 700    | 1380. 6 | 1381. 3 | 1382. 0 | 1382. 7 | 1383. 4 | 1384. 2 | 1384. 9 | 1385. 6 | 1386. 3 | 1387. 1 | 1387. 8 | 15. 700    |
| 15. 800    | 1387. 8 | 1388. 5 | 1389. 2 | 1389. 9 | 1390. 7 | 1391. 4 | 1392. 1 | 1392. 8 | 1393. 5 | 1394. 3 | 1395. 0 | 15. 800    |
| 15. 900    | 1395. 0 | 1395. 7 | 1396. 4 | 1397. 2 | 1397. 9 | 1398. 6 | 1399. 3 | 1400. 1 | 1400. 8 | 1401. 5 | 1402. 2 | 15. 900    |
| 16. 000    | 1402. 2 | 1402. 9 | 1403. 6 | 1404. 4 | 1405. 1 | 1405. 8 | 1406. 5 | 1407. 3 | 1408. 0 | 1408. 7 | 1409. 4 | 16. 000    |
| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |



**Table 3. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------|
| Degrees C  |         |         |         |         |         |         |         |         |         |         |         |            |
| 16. 000    | 1402. 2 | 1402. 9 | 1403. 6 | 1404. 4 | 1405. 1 | 1405. 8 | 1406. 5 | 1407. 3 | 1408. 0 | 1408. 7 | 1409. 4 | 16. 000    |
| 16. 100    | 1409. 4 | 1410. 1 | 1410. 8 | 1411. 6 | 1412. 3 | 1413. 0 | 1413. 7 | 1414. 5 | 1415. 2 | 1415. 9 | 1416. 6 | 16. 100    |
| 16. 200    | 1416. 6 | 1417. 3 | 1418. 1 | 1418. 8 | 1419. 5 | 1420. 2 | 1420. 9 | 1421. 7 | 1422. 4 | 1423. 1 | 1423. 8 | 16. 200    |
| 16. 300    | 1423. 8 | 1424. 5 | 1425. 3 | 1426. 0 | 1426. 7 | 1427. 4 | 1428. 1 | 1428. 9 | 1429. 6 | 1430. 3 | 1431. 0 | 16. 300    |
| 16. 400    | 1431. 0 | 1431. 7 | 1432. 5 | 1433. 2 | 1433. 9 | 1434. 6 | 1435. 4 | 1436. 1 | 1436. 8 | 1437. 5 | 1438. 2 | 16. 400    |
| 16. 500    | 1438. 2 | 1438. 9 | 1439. 7 | 1440. 4 | 1441. 1 | 1441. 8 | 1442. 6 | 1443. 3 | 1444. 0 | 1444. 7 | 1445. 4 | 16. 500    |
| 16. 600    | 1445. 4 | 1446. 2 | 1446. 9 | 1447. 6 | 1448. 3 | 1449. 0 | 1449. 8 | 1450. 5 | 1451. 2 | 1451. 9 | 1452. 6 | 16. 600    |
| 16. 700    | 1452. 6 | 1453. 4 | 1454. 1 | 1454. 8 | 1455. 5 | 1456. 3 | 1457. 0 | 1457. 7 | 1458. 4 | 1459. 1 | 1459. 8 | 16. 700    |
| 16. 800    | 1459. 8 | 1460. 6 | 1461. 3 | 1462. 0 | 1462. 7 | 1463. 5 | 1464. 2 | 1464. 9 | 1465. 6 | 1466. 3 | 1467. 0 | 16. 800    |
| 16. 900    | 1467. 0 | 1467. 8 | 1468. 5 | 1469. 2 | 1470. 0 | 1470. 7 | 1471. 4 | 1472. 1 | 1472. 9 | 1473. 6 | 1474. 3 | 16. 900    |
| 17. 000    | 1474. 3 | 1475. 0 | 1475. 7 | 1476. 5 | 1477. 2 | 1477. 9 | 1478. 6 | 1479. 4 | 1480. 1 | 1480. 8 | 1481. 6 | 17. 000    |
| 17. 100    | 1481. 6 | 1482. 3 | 1483. 0 | 1483. 7 | 1484. 4 | 1485. 2 | 1485. 9 | 1486. 6 | 1487. 4 | 1488. 1 | 1488. 8 | 17. 100    |
| 17. 200    | 1488. 8 | 1489. 5 | 1490. 3 | 1491. 0 | 1491. 7 | 1492. 4 | 1493. 2 | 1493. 9 | 1494. 6 | 1495. 4 | 1496. 1 | 17. 200    |
| 17. 300    | 1496. 1 | 1496. 8 | 1497. 5 | 1498. 3 | 1499. 0 | 1499. 7 | 1500. 4 | 1501. 2 | 1501. 9 | 1502. 6 | 1503. 3 | 17. 300    |
| 17. 400    | 1503. 3 | 1504. 0 | 1504. 8 | 1505. 5 | 1506. 2 | 1507. 0 | 1507. 7 | 1508. 4 | 1509. 2 | 1509. 9 | 1510. 6 | 17. 400    |
| 17. 500    | 1510. 6 | 1511. 3 | 1512. 1 | 1512. 8 | 1513. 5 | 1514. 2 | 1514. 9 | 1515. 7 | 1516. 4 | 1517. 1 | 1517. 8 | 17. 500    |
| 17. 600    | 1517. 8 | 1518. 6 | 1519. 3 | 1520. 0 | 1520. 7 | 1521. 5 | 1522. 2 | 1522. 9 | 1523. 6 | 1524. 4 | 1525. 1 | 17. 600    |
| 17. 700    | 1525. 1 | 1525. 8 | 1526. 5 | 1527. 3 | 1528. 0 | 1528. 7 | 1529. 4 | 1530. 2 | 1530. 9 | 1531. 6 | 1532. 3 | 17. 700    |
| 17. 800    | 1532. 3 | 1533. 1 | 1533. 8 | 1534. 5 | 1535. 2 | 1536. 0 | 1536. 7 | 1537. 4 | 1538. 1 | 1538. 9 | 1539. 6 | 17. 800    |
| 17. 900    | 1539. 6 | 1540. 3 | 1541. 1 | 1541. 8 | 1542. 5 | 1543. 2 | 1544. 0 | 1544. 7 | 1545. 4 | 1546. 2 | 1546. 9 | 17. 900    |
| 18. 000    | 1546. 9 | 1547. 6 | 1548. 3 | 1549. 1 | 1549. 8 | 1550. 5 | 1551. 3 | 1552. 0 | 1552. 7 | 1553. 5 | 1554. 2 | 18. 000    |
| 18. 100    | 1554. 2 | 1554. 9 | 1555. 6 | 1556. 4 | 1557. 1 | 1557. 8 | 1558. 6 | 1559. 3 | 1560. 1 | 1560. 8 | 1561. 5 | 18. 100    |
| 18. 200    | 1561. 5 | 1562. 2 | 1563. 0 | 1563. 7 | 1564. 4 | 1565. 1 | 1565. 9 | 1566. 6 | 1567. 3 | 1568. 1 | 1568. 8 | 18. 200    |
| 18. 300    | 1568. 8 | 1569. 5 | 1570. 3 | 1571. 0 | 1571. 7 | 1572. 5 | 1573. 2 | 1573. 9 | 1574. 6 | 1575. 4 | 1576. 1 | 18. 300    |
| 18. 400    | 1576. 1 | 1576. 8 | 1577. 6 | 1578. 3 | 1579. 0 | 1579. 8 | 1580. 5 | 1581. 2 | 1581. 9 | 1582. 7 | 1583. 4 | 18. 400    |
| 18. 500    | 1583. 4 | 1584. 1 | 1584. 9 | 1585. 6 | 1586. 3 | 1587. 1 | 1587. 8 | 1588. 5 | 1589. 3 | 1590. 0 | 1590. 7 | 18. 500    |
| 18. 600    | 1590. 7 | 1591. 4 | 1592. 2 | 1592. 9 | 1593. 6 | 1594. 4 | 1595. 1 | 1595. 8 | 1596. 6 | 1597. 3 | 1598. 0 | 18. 600    |
| 18. 700    | 1598. 0 | 1598. 7 | 1599. 5 | 1600. 2 | 1600. 9 | 1601. 7 | 1602. 4 | 1603. 1 | 1603. 9 | 1604. 6 | 1605. 3 | 18. 700    |
| 18. 800    | 1605. 3 | 1606. 0 | 1606. 8 | 1607. 5 | 1608. 3 | 1609. 0 | 1609. 7 | 1610. 4 | 1611. 2 | 1611. 9 | 1612. 6 | 18. 800    |
| 18. 900    | 1612. 6 | 1613. 4 | 1614. 1 | 1614. 8 | 1615. 6 | 1616. 3 | 1617. 0 | 1617. 8 | 1618. 5 | 1619. 2 | 1619. 9 | 18. 900    |
| 19. 000    | 1619. 9 | 1620. 7 | 1621. 4 | 1622. 1 | 1622. 9 | 1623. 6 | 1624. 3 | 1625. 1 | 1625. 8 | 1626. 5 | 1627. 3 | 19. 000    |
| 19. 100    | 1627. 3 | 1628. 0 | 1628. 7 | 1629. 5 | 1630. 2 | 1631. 0 | 1631. 7 | 1632. 4 | 1633. 1 | 1633. 9 | 1634. 6 | 19. 100    |
| 19. 200    | 1634. 6 | 1635. 4 | 1636. 1 | 1636. 8 | 1637. 6 | 1638. 3 | 1639. 0 | 1639. 8 | 1640. 5 | 1641. 2 | 1642. 0 | 19. 200    |
| 19. 300    | 1642. 0 | 1642. 7 | 1643. 4 | 1644. 2 | 1644. 9 | 1645. 6 | 1646. 4 | 1647. 1 | 1647. 8 | 1648. 6 | 1649. 3 | 19. 300    |
| 19. 400    | 1649. 3 | 1650. 1 | 1650. 8 | 1651. 5 | 1652. 2 | 1653. 0 | 1653. 7 | 1654. 5 | 1655. 2 | 1655. 9 | 1656. 7 | 19. 400    |
| 19. 500    | 1656. 7 | 1657. 4 | 1658. 1 | 1658. 9 | 1659. 6 | 1660. 4 | 1661. 1 | 1661. 8 | 1662. 5 | 1663. 3 | 1664. 0 | 19. 500    |
| 19. 600    | 1664. 0 | 1664. 7 | 1665. 5 | 1666. 2 | 1666. 9 | 1667. 7 | 1668. 4 | 1669. 1 | 1669. 9 | 1670. 6 | 1671. 3 | 19. 600    |
| 19. 700    | 1671. 3 | 1672. 1 | 1672. 8 | 1673. 6 | 1674. 3 | 1675. 0 | 1675. 8 | 1676. 5 | 1677. 2 | 1678. 0 | 1678. 7 | 19. 700    |
| 19. 800    | 1678. 7 | 1679. 4 | 1680. 2 | 1680. 9 | 1681. 6 | 1682. 4 | 1683. 1 | 1683. 8 | 1684. 6 | 1685. 3 | 1686. 0 | 19. 800    |
| 19. 900    | 1686. 0 | 1686. 8 | 1687. 5 | 1688. 3 | 1689. 0 | 1689. 7 | 1690. 5 | 1691. 2 | 1691. 9 | 1692. 7 | 1693. 4 | 19. 900    |
| 20. 000    | 1693. 4 | 1694. 1 | 1694. 9 | 1695. 6 | 1696. 4 | 1697. 1 | 1697. 8 | 1698. 6 | 1699. 3 | 1700. 0 | 1700. 8 | 20. 000    |
| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |



# Table 4. Platinum Versus Platinum-13-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| ° C | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° C |
|-----|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|     | Millivolts |       |       |       |       |       |       |       |       |       |       |     |
| 0   | 0.000      | 0.005 | 0.011 | 0.016 | 0.022 | 0.027 | 0.033 | 0.038 | 0.043 | 0.049 | 0.055 | 0   |
| 10  | .055       | .061  | .066  | .072  | .078  | .083  | .089  | .095  | .101  | .106  | .112  | 10  |
| 20  | .112       | .118  | .124  | .130  | .136  | .142  | .148  | .154  | .160  | .166  | .172  | 20  |
| 30  | .172       | .178  | .184  | .190  | .196  | .203  | .209  | .215  | .221  | .228  | .234  | 30  |
| 40  | .234       | .240  | .246  | .252  | .259  | .265  | .272  | .278  | .285  | .291  | .298  | 40  |
| 50  | .298       | .304  | .311  | .317  | .324  | .330  | .337  | .343  | .350  | .357  | .363  | 50  |
| 60  | .363       | .370  | .377  | .383  | .390  | .397  | .403  | .410  | .417  | .424  | .431  | 60  |
| 70  | .431       | .438  | .445  | .451  | .458  | .465  | .472  | .479  | .486  | .493  | .500  | 70  |
| 80  | .500       | .507  | .514  | .521  | .528  | .536  | .543  | .550  | .557  | .565  | .572  | 80  |
| 90  | .572       | .579  | .586  | .594  | .601  | .609  | .616  | .623  | .631  | .638  | .645  | 90  |
| 100 | .645       | .653  | .660  | .668  | .675  | .683  | .690  | .698  | .705  | .713  | .721  | 100 |
| 110 | .721       | .728  | .736  | .744  | .752  | .759  | .767  | .775  | .782  | .790  | .798  | 110 |
| 120 | .798       | .805  | .813  | .821  | .829  | .837  | .845  | .853  | .861  | .869  | .877  | 120 |
| 130 | .877       | .885  | .893  | .901  | .909  | .917  | .925  | .933  | .941  | .949  | .957  | 130 |
| 140 | .957       | .966  | .974  | .982  | .990  | .998  | 1.006 | 1.014 | 1.022 | 1.031 | 1.039 | 140 |
| 150 | 1.039      | 1.047 | 1.055 | 1.063 | 1.072 | 1.080 | 1.088 | 1.096 | 1.104 | 1.112 | 1.121 | 150 |
| 160 | 1.121      | 1.129 | 1.138 | 1.146 | 1.154 | 1.163 | 1.171 | 1.179 | 1.188 | 1.196 | 1.205 | 160 |
| 170 | 1.205      | 1.213 | 1.222 | 1.231 | 1.239 | 1.247 | 1.256 | 1.265 | 1.273 | 1.282 | 1.290 | 170 |
| 180 | 1.290      | 1.298 | 1.307 | 1.316 | 1.324 | 1.333 | 1.342 | 1.351 | 1.359 | 1.368 | 1.377 | 180 |
| 190 | 1.377      | 1.386 | 1.395 | 1.403 | 1.412 | 1.420 | 1.429 | 1.438 | 1.447 | 1.456 | 1.465 | 190 |
| 200 | 1.465      | 1.473 | 1.482 | 1.491 | 1.500 | 1.509 | 1.517 | 1.526 | 1.535 | 1.544 | 1.553 | 200 |
| 210 | 1.553      | 1.562 | 1.571 | 1.580 | 1.589 | 1.598 | 1.607 | 1.616 | 1.625 | 1.634 | 1.643 | 210 |
| 220 | 1.643      | 1.652 | 1.661 | 1.670 | 1.679 | 1.688 | 1.697 | 1.706 | 1.715 | 1.725 | 1.734 | 220 |
| 230 | 1.734      | 1.743 | 1.752 | 1.761 | 1.770 | 1.779 | 1.788 | 1.798 | 1.807 | 1.816 | 1.826 | 230 |
| 240 | 1.826      | 1.835 | 1.844 | 1.853 | 1.863 | 1.872 | 1.881 | 1.890 | 1.900 | 1.909 | 1.918 | 240 |
| 250 | 1.918      | 1.928 | 1.937 | 1.946 | 1.956 | 1.965 | 1.974 | 1.984 | 1.993 | 2.002 | 2.012 | 250 |
| 260 | 2.012      | 2.021 | 2.031 | 2.040 | 2.050 | 2.059 | 2.068 | 2.078 | 2.087 | 2.097 | 2.107 | 260 |
| 270 | 2.107      | 2.116 | 2.126 | 2.135 | 2.145 | 2.154 | 2.164 | 2.173 | 2.183 | 2.192 | 2.202 | 270 |
| 280 | 2.202      | 2.211 | 2.221 | 2.231 | 2.240 | 2.250 | 2.259 | 2.269 | 2.279 | 2.288 | 2.298 | 280 |
| 290 | 2.298      | 2.308 | 2.317 | 2.327 | 2.337 | 2.346 | 2.356 | 2.366 | 2.375 | 2.385 | 2.395 | 290 |
| 300 | 2.395      | 2.405 | 2.415 | 2.424 | 2.434 | 2.444 | 2.454 | 2.464 | 2.473 | 2.483 | 2.493 | 300 |
| 310 | 2.493      | 2.503 | 2.513 | 2.522 | 2.532 | 2.542 | 2.552 | 2.562 | 2.572 | 2.581 | 2.591 | 310 |
| 320 | 2.591      | 2.601 | 2.611 | 2.621 | 2.631 | 2.641 | 2.650 | 2.660 | 2.670 | 2.680 | 2.690 | 320 |
| 330 | 2.690      | 2.700 | 2.710 | 2.720 | 2.730 | 2.740 | 2.750 | 2.760 | 2.770 | 2.780 | 2.790 | 330 |
| 340 | 2.790      | 2.800 | 2.810 | 2.820 | 2.830 | 2.840 | 2.850 | 2.860 | 2.870 | 2.880 | 2.890 | 340 |
| 350 | 2.890      | 2.900 | 2.910 | 2.920 | 2.930 | 2.940 | 2.950 | 2.961 | 2.971 | 2.981 | 2.991 | 350 |
| 360 | 2.991      | 3.001 | 3.011 | 3.021 | 3.031 | 3.041 | 3.051 | 3.062 | 3.072 | 3.082 | 3.092 | 360 |
| 370 | 3.092      | 3.102 | 3.112 | 3.122 | 3.133 | 3.143 | 3.153 | 3.163 | 3.173 | 3.183 | 3.194 | 370 |
| 380 | 3.194      | 3.204 | 3.214 | 3.224 | 3.234 | 3.245 | 3.255 | 3.265 | 3.276 | 3.286 | 3.296 | 380 |
| 390 | 3.296      | 3.306 | 3.317 | 3.327 | 3.337 | 3.347 | 3.358 | 3.368 | 3.378 | 3.389 | 3.399 | 390 |
| 400 | 3.399      | 3.409 | 3.420 | 3.430 | 3.440 | 3.451 | 3.461 | 3.471 | 3.481 | 3.492 | 3.502 | 400 |
| ° C | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° C |

**Table 4. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

**Electromotive Force in Absolute Millivolts.    Temperatures in Degrees C (Int. 1948).    Reference Junctions at 0° C.)**

| °C  | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °C  |
|-----|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----|
|     | Millivolts |        |        |        |        |        |        |        |        |        |        |     |
| 400 | 3. 399     | 3. 409 | 3. 420 | 3. 430 | 3. 440 | 3. 451 | 3. 461 | 3. 471 | 3. 481 | 3. 492 | 3. 502 | 400 |
| 410 | 3. 502     | 3. 512 | 3. 523 | 3. 533 | 3. 544 | 3. 554 | 3. 565 | 3. 575 | 3. 586 | 3. 596 | 3. 607 | 410 |
| 420 | 3. 607     | 3. 617 | 3. 627 | 3. 638 | 3. 648 | 3. 659 | 3. 669 | 3. 680 | 3. 690 | 3. 701 | 3. 712 | 420 |
| 430 | 3. 712     | 3. 722 | 3. 732 | 3. 743 | 3. 753 | 3. 764 | 3. 774 | 3. 785 | 3. 796 | 3. 806 | 3. 817 | 430 |
| 440 | 3. 817     | 3. 827 | 3. 838 | 3. 848 | 3. 859 | 3. 870 | 3. 880 | 3. 891 | 3. 901 | 3. 912 | 3. 923 | 440 |
| 450 | 3. 923     | 3. 933 | 3. 944 | 3. 954 | 3. 965 | 3. 976 | 3. 987 | 3. 997 | 4. 008 | 4. 018 | 4. 029 | 450 |
| 460 | 4. 029     | 4. 039 | 4. 050 | 4. 060 | 4. 071 | 4. 081 | 4. 092 | 4. 102 | 4. 113 | 4. 123 | 4. 134 | 460 |
| 470 | 4. 134     | 4. 145 | 4. 156 | 4. 166 | 4. 177 | 4. 187 | 4. 198 | 4. 209 | 4. 219 | 4. 230 | 4. 241 | 470 |
| 480 | 4. 241     | 4. 251 | 4. 262 | 4. 273 | 4. 283 | 4. 294 | 4. 305 | 4. 315 | 4. 326 | 4. 337 | 4. 348 | 480 |
| 490 | 4. 348     | 4. 358 | 4. 369 | 4. 380 | 4. 390 | 4. 401 | 4. 412 | 4. 422 | 4. 433 | 4. 444 | 4. 455 | 490 |
| 500 | 4. 455     | 4. 466 | 4. 477 | 4. 488 | 4. 498 | 4. 509 | 4. 520 | 4. 531 | 4. 542 | 4. 552 | 4. 563 | 500 |
| 510 | 4. 563     | 4. 574 | 4. 585 | 4. 596 | 4. 607 | 4. 618 | 4. 629 | 4. 640 | 4. 651 | 4. 662 | 4. 672 | 510 |
| 520 | 4. 672     | 4. 683 | 4. 694 | 4. 705 | 4. 716 | 4. 727 | 4. 738 | 4. 749 | 4. 760 | 4. 771 | 4. 782 | 520 |
| 530 | 4. 782     | 4. 793 | 4. 804 | 4. 815 | 4. 826 | 4. 837 | 4. 848 | 4. 859 | 4. 870 | 4. 881 | 4. 893 | 530 |
| 540 | 4. 893     | 4. 904 | 4. 915 | 4. 926 | 4. 937 | 4. 948 | 4. 959 | 4. 970 | 4. 981 | 4. 992 | 5. 004 | 540 |
| 550 | 5. 004     | 5. 015 | 5. 026 | 5. 037 | 5. 048 | 5. 059 | 5. 070 | 5. 081 | 5. 092 | 5. 104 | 5. 115 | 550 |
| 560 | 5. 115     | 5. 126 | 5. 137 | 5. 148 | 5. 159 | 5. 170 | 5. 182 | 5. 193 | 5. 204 | 5. 215 | 5. 226 | 560 |
| 570 | 5. 226     | 5. 238 | 5. 249 | 5. 260 | 5. 271 | 5. 282 | 5. 293 | 5. 304 | 5. 316 | 5. 327 | 5. 338 | 570 |
| 580 | 5. 338     | 5. 349 | 5. 360 | 5. 371 | 5. 383 | 5. 394 | 5. 405 | 5. 416 | 5. 428 | 5. 439 | 5. 450 | 580 |
| 590 | 5. 450     | 5. 461 | 5. 472 | 5. 484 | 5. 495 | 5. 507 | 5. 518 | 5. 529 | 5. 540 | 5. 551 | 5. 563 | 590 |
| 600 | 5. 563     | 5. 574 | 5. 586 | 5. 597 | 5. 609 | 5. 620 | 5. 631 | 5. 642 | 5. 654 | 5. 665 | 5. 677 | 600 |
| 610 | 5. 677     | 5. 688 | 5. 700 | 5. 711 | 5. 723 | 5. 734 | 5. 746 | 5. 757 | 5. 769 | 5. 780 | 5. 792 | 610 |
| 620 | 5. 792     | 5. 803 | 5. 814 | 5. 826 | 5. 837 | 5. 849 | 5. 861 | 5. 872 | 5. 883 | 5. 895 | 5. 907 | 620 |
| 630 | 5. 907     | 5. 918 | 5. 930 | 5. 941 | 5. 952 | 5. 964 | 5. 976 | 5. 987 | 5. 999 | 6. 010 | 6. 022 | 630 |
| 640 | 6. 022     | 6. 033 | 6. 044 | 6. 056 | 6. 068 | 6. 079 | 6. 091 | 6. 102 | 6. 114 | 6. 126 | 6. 137 | 640 |
| 650 | 6. 137     | 6. 149 | 6. 160 | 6. 171 | 6. 183 | 6. 194 | 6. 206 | 6. 218 | 6. 229 | 6. 240 | 6. 252 | 650 |
| 660 | 6. 252     | 6. 264 | 6. 275 | 6. 287 | 6. 299 | 6. 310 | 6. 321 | 6. 333 | 6. 344 | 6. 356 | 6. 368 | 660 |
| 670 | 6. 368     | 6. 380 | 6. 391 | 6. 403 | 6. 415 | 6. 427 | 6. 438 | 6. 450 | 6. 461 | 6. 473 | 6. 485 | 670 |
| 680 | 6. 485     | 6. 497 | 6. 508 | 6. 520 | 6. 532 | 6. 544 | 6. 555 | 6. 567 | 6. 579 | 6. 590 | 6. 602 | 680 |
| 690 | 6. 602     | 6. 614 | 6. 626 | 6. 637 | 6. 649 | 6. 661 | 6. 672 | 6. 684 | 6. 696 | 6. 708 | 6. 720 | 690 |
| 700 | 6. 720     | 6. 732 | 6. 744 | 6. 756 | 6. 768 | 6. 779 | 6. 791 | 6. 803 | 6. 815 | 6. 827 | 6. 838 | 700 |
| 710 | 6. 838     | 6. 850 | 6. 862 | 6. 874 | 6. 886 | 6. 898 | 6. 910 | 6. 922 | 6. 934 | 6. 946 | 6. 957 | 710 |
| 720 | 6. 957     | 6. 969 | 6. 981 | 6. 993 | 7. 005 | 7. 017 | 7. 029 | 7. 040 | 7. 052 | 7. 064 | 7. 076 | 720 |
| 730 | 7. 076     | 7. 088 | 7. 100 | 7. 112 | 7. 124 | 7. 136 | 7. 147 | 7. 159 | 7. 171 | 7. 183 | 7. 195 | 730 |
| 740 | 7. 195     | 7. 207 | 7. 219 | 7. 231 | 7. 243 | 7. 255 | 7. 267 | 7. 279 | 7. 291 | 7. 303 | 7. 315 | 740 |
| 750 | 7. 315     | 7. 327 | 7. 339 | 7. 351 | 7. 364 | 7. 376 | 7. 388 | 7. 400 | 7. 412 | 7. 424 | 7. 436 | 750 |
| 760 | 7. 436     | 7. 448 | 7. 460 | 7. 472 | 7. 485 | 7. 497 | 7. 509 | 7. 521 | 7. 533 | 7. 545 | 7. 557 | 760 |
| 770 | 7. 557     | 7. 570 | 7. 582 | 7. 594 | 7. 606 | 7. 618 | 7. 631 | 7. 643 | 7. 655 | 7. 667 | 7. 679 | 770 |
| 780 | 7. 679     | 7. 692 | 7. 704 | 7. 716 | 7. 728 | 7. 740 | 7. 752 | 7. 765 | 7. 777 | 7. 789 | 7. 801 | 780 |
| 790 | 7. 801     | 7. 814 | 7. 826 | 7. 838 | 7. 850 | 7. 863 | 7. 875 | 7. 888 | 7. 900 | 7. 912 | 7. 924 | 790 |
| 800 | 7. 924     | 7. 936 | 7. 949 | 7. 961 | 7. 973 | 7. 986 | 7. 998 | 8. 010 | 8. 022 | 8. 035 | 8. 047 | 800 |
| °C  | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °C  |



# Table 4. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| ° C   | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° C   |
|-------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
|       | Millivolts |        |        |        |        |        |        |        |        |        |        |       |
| 800   | 7.924      | 7.936  | 7.949  | 7.961  | 7.973  | 7.986  | 7.998  | 8.010  | 8.022  | 8.035  | 8.047  | 800   |
| 810   | 8.047      | 8.059  | 8.071  | 8.084  | 8.096  | 8.109  | 8.121  | 8.134  | 8.146  | 8.158  | 8.170  | 810   |
| 820   | 8.170      | 8.182  | 8.195  | 8.208  | 8.220  | 8.232  | 8.245  | 8.257  | 8.269  | 8.281  | 8.294  | 820   |
| 830   | 8.294      | 8.306  | 8.319  | 8.331  | 8.343  | 8.356  | 8.369  | 8.381  | 8.394  | 8.406  | 8.419  | 830   |
| 840   | 8.419      | 8.431  | 8.444  | 8.456  | 8.469  | 8.481  | 8.494  | 8.506  | 8.519  | 8.531  | 8.544  | 840   |
| 850   | 8.544      | 8.556  | 8.569  | 8.581  | 8.594  | 8.606  | 8.619  | 8.631  | 8.644  | 8.656  | 8.669  | 850   |
| 860   | 8.669      | 8.681  | 8.694  | 8.706  | 8.719  | 8.732  | 8.744  | 8.757  | 8.769  | 8.782  | 8.795  | 860   |
| 870   | 8.795      | 8.807  | 8.820  | 8.832  | 8.845  | 8.858  | 8.870  | 8.883  | 8.895  | 8.908  | 8.921  | 870   |
| 880   | 8.921      | 8.933  | 8.946  | 8.959  | 8.971  | 8.984  | 8.996  | 9.009  | 9.021  | 9.034  | 9.047  | 880   |
| 890   | 9.047      | 9.060  | 9.072  | 9.085  | 9.098  | 9.111  | 9.123  | 9.136  | 9.149  | 9.161  | 9.175  | 890   |
| 900   | 9.175      | 9.188  | 9.200  | 9.213  | 9.226  | 9.239  | 9.251  | 9.264  | 9.277  | 9.290  | 9.303  | 900   |
| 910   | 9.303      | 9.316  | 9.328  | 9.341  | 9.354  | 9.367  | 9.379  | 9.392  | 9.405  | 9.418  | 9.431  | 910   |
| 920   | 9.431      | 9.444  | 9.456  | 9.469  | 9.482  | 9.495  | 9.508  | 9.520  | 9.533  | 9.546  | 9.559  | 920   |
| 930   | 9.559      | 9.572  | 9.585  | 9.598  | 9.610  | 9.623  | 9.636  | 9.649  | 9.661  | 9.674  | 9.687  | 930   |
| 940   | 9.687      | 9.700  | 9.713  | 9.726  | 9.739  | 9.752  | 9.765  | 9.778  | 9.790  | 9.803  | 9.816  | 940   |
| 950   | 9.816      | 9.829  | 9.842  | 9.855  | 9.868  | 9.881  | 9.894  | 9.907  | 9.920  | 9.933  | 9.946  | 950   |
| 960   | 9.946      | 9.960  | 9.973  | 9.986  | 9.999  | 10.012 | 10.025 | 10.038 | 10.051 | 10.064 | 10.077 | 960   |
| 970   | 10.077     | 10.090 | 10.103 | 10.116 | 10.130 | 10.143 | 10.156 | 10.169 | 10.182 | 10.195 | 10.208 | 970   |
| 980   | 10.208     | 10.221 | 10.234 | 10.247 | 10.260 | 10.274 | 10.287 | 10.300 | 10.313 | 10.326 | 10.339 | 980   |
| 990   | 10.339     | 10.352 | 10.366 | 10.379 | 10.392 | 10.405 | 10.419 | 10.432 | 10.445 | 10.458 | 10.471 | 990   |
| 1,000 | 10.471     | 10.484 | 10.497 | 10.510 | 10.523 | 10.537 | 10.550 | 10.563 | 10.576 | 10.589 | 10.603 | 1,000 |
| 1,010 | 10.603     | 10.616 | 10.629 | 10.642 | 10.655 | 10.669 | 10.682 | 10.695 | 10.709 | 10.722 | 10.735 | 1,010 |
| 1,020 | 10.735     | 10.748 | 10.761 | 10.775 | 10.788 | 10.801 | 10.815 | 10.828 | 10.841 | 10.855 | 10.869 | 1,020 |
| 1,030 | 10.869     | 10.882 | 10.895 | 10.909 | 10.922 | 10.936 | 10.949 | 10.963 | 10.976 | 10.989 | 11.003 | 1,030 |
| 1,040 | 11.003     | 11.016 | 11.030 | 11.043 | 11.057 | 11.070 | 11.084 | 11.097 | 11.111 | 11.124 | 11.138 | 1,040 |
| 1,050 | 11.138     | 11.151 | 11.165 | 11.178 | 11.191 | 11.205 | 11.219 | 11.232 | 11.246 | 11.259 | 11.273 | 1,050 |
| 1,060 | 11.273     | 11.286 | 11.300 | 11.313 | 11.327 | 11.340 | 11.354 | 11.367 | 11.381 | 11.394 | 11.408 | 1,060 |
| 1,070 | 11.408     | 11.421 | 11.435 | 11.449 | 11.463 | 11.476 | 11.490 | 11.504 | 11.517 | 11.531 | 11.544 | 1,070 |
| 1,080 | 11.544     | 11.558 | 11.571 | 11.585 | 11.599 | 11.613 | 11.626 | 11.640 | 11.654 | 11.667 | 11.681 | 1,080 |
| 1,090 | 11.681     | 11.694 | 11.708 | 11.722 | 11.736 | 11.749 | 11.763 | 11.776 | 11.790 | 11.803 | 11.817 | 1,090 |
| 1,100 | 11.817     | 11.830 | 11.844 | 11.858 | 11.871 | 11.885 | 11.899 | 11.913 | 11.926 | 11.940 | 11.954 | 1,100 |
| 1,110 | 11.954     | 11.967 | 11.981 | 11.994 | 12.008 | 12.022 | 12.035 | 12.049 | 12.063 | 12.077 | 12.090 | 1,110 |
| 1,120 | 12.090     | 12.104 | 12.118 | 12.131 | 12.145 | 12.159 | 12.173 | 12.186 | 12.200 | 12.214 | 12.227 | 1,120 |
| 1,130 | 12.227     | 12.241 | 12.254 | 12.268 | 12.282 | 12.296 | 12.310 | 12.323 | 12.337 | 12.351 | 12.365 | 1,130 |
| 1,140 | 12.365     | 12.378 | 12.392 | 12.406 | 12.420 | 12.434 | 12.447 | 12.461 | 12.475 | 12.489 | 12.503 | 1,140 |
| 1,150 | 12.503     | 12.516 | 12.530 | 12.544 | 12.558 | 12.572 | 12.585 | 12.599 | 12.613 | 12.627 | 12.641 | 1,150 |
| 1,160 | 12.641     | 12.654 | 12.668 | 12.682 | 12.696 | 12.710 | 12.723 | 12.737 | 12.751 | 12.765 | 12.779 | 1,160 |
| 1,170 | 12.779     | 12.792 | 12.806 | 12.820 | 12.834 | 12.848 | 12.861 | 12.875 | 12.889 | 12.903 | 12.917 | 1,170 |
| 1,180 | 12.917     | 12.931 | 12.944 | 12.958 | 12.972 | 12.986 | 13.000 | 13.014 | 13.028 | 13.042 | 13.055 | 1,180 |
| 1,190 | 13.055     | 13.069 | 13.083 | 13.097 | 13.111 | 13.125 | 13.139 | 13.152 | 13.166 | 13.180 | 13.193 | 1,190 |
| 1,200 | 13.193     | 13.207 | 13.221 | 13.235 | 13.249 | 13.263 | 13.277 | 13.291 | 13.305 | 13.319 | 13.333 | 1,200 |
| ° C   | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° C   |



**Table 4. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| ° C    | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° C    |
|--------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
|        | Millivolts |         |         |         |         |         |         |         |         |         |         |        |
| 1, 200 | 13. 193    | 13. 207 | 13. 221 | 13. 235 | 13. 249 | 13. 263 | 13. 277 | 13. 291 | 13. 305 | 13. 319 | 13. 332 | 1, 200 |
| 1, 210 | 13. 332    | 13. 346 | 13. 360 | 13. 374 | 13. 388 | 13. 402 | 13. 416 | 13. 429 | 13. 443 | 13. 457 | 13. 471 | 1, 210 |
| 1, 220 | 13. 471    | 13. 485 | 13. 499 | 13. 513 | 13. 526 | 13. 540 | 13. 554 | 13. 568 | 13. 582 | 13. 596 | 13. 610 | 1, 220 |
| 1, 230 | 13. 610    | 13. 624 | 13. 638 | 13. 652 | 13. 666 | 13. 679 | 13. 693 | 13. 707 | 13. 721 | 13. 735 | 13. 749 | 1, 230 |
| 1, 240 | 13. 749    | 13. 763 | 13. 777 | 13. 791 | 13. 805 | 13. 818 | 13. 832 | 13. 846 | 13. 860 | 13. 874 | 13. 888 | 1, 240 |
| 1, 250 | 13. 888    | 13. 902 | 13. 916 | 13. 930 | 13. 943 | 13. 957 | 13. 971 | 13. 985 | 13. 999 | 14. 013 | 14. 027 | 1, 250 |
| 1, 260 | 14. 027    | 14. 041 | 14. 055 | 14. 069 | 14. 082 | 14. 096 | 14. 110 | 14. 124 | 14. 138 | 14. 152 | 14. 165 | 1, 260 |
| 1, 270 | 14. 165    | 14. 179 | 14. 193 | 14. 207 | 14. 221 | 14. 235 | 14. 249 | 14. 263 | 14. 277 | 14. 291 | 14. 304 | 1, 270 |
| 1, 280 | 14. 304    | 14. 318 | 14. 332 | 14. 346 | 14. 360 | 14. 374 | 14. 388 | 14. 402 | 14. 416 | 14. 430 | 14. 443 | 1, 280 |
| 1, 290 | 14. 443    | 14. 457 | 14. 471 | 14. 485 | 14. 499 | 14. 513 | 14. 527 | 14. 541 | 14. 555 | 14. 569 | 14. 582 | 1, 290 |
| 1, 300 | 14. 582    | 14. 596 | 14. 610 | 14. 624 | 14. 638 | 14. 652 | 14. 666 | 14. 680 | 14. 694 | 14. 707 | 14. 721 | 1, 300 |
| 1, 310 | 14. 721    | 14. 735 | 14. 749 | 14. 763 | 14. 777 | 14. 791 | 14. 804 | 14. 818 | 14. 832 | 14. 846 | 14. 860 | 1, 310 |
| 1, 320 | 14. 860    | 14. 874 | 14. 888 | 14. 901 | 14. 915 | 14. 929 | 14. 943 | 14. 957 | 14. 971 | 14. 985 | 14. 999 | 1, 320 |
| 1, 330 | 14. 999    | 15. 013 | 15. 026 | 15. 040 | 15. 054 | 15. 068 | 15. 082 | 15. 096 | 15. 110 | 15. 124 | 15. 138 | 1, 330 |
| 1, 340 | 15. 138    | 15. 151 | 15. 165 | 15. 179 | 15. 193 | 15. 207 | 15. 221 | 15. 234 | 15. 248 | 15. 262 | 15. 276 | 1, 340 |
| 1, 350 | 15. 276    | 15. 290 | 15. 304 | 15. 318 | 15. 331 | 15. 345 | 15. 359 | 15. 373 | 15. 387 | 15. 401 | 15. 415 | 1, 350 |
| 1, 360 | 15. 415    | 15. 429 | 15. 443 | 15. 456 | 15. 470 | 15. 484 | 15. 498 | 15. 512 | 15. 526 | 15. 540 | 15. 553 | 1, 360 |
| 1, 370 | 15. 553    | 15. 567 | 15. 581 | 15. 595 | 15. 609 | 15. 623 | 15. 637 | 15. 651 | 15. 665 | 15. 679 | 15. 692 | 1, 370 |
| 1, 380 | 15. 692    | 15. 706 | 15. 720 | 15. 734 | 15. 748 | 15. 761 | 15. 775 | 15. 789 | 15. 803 | 15. 817 | 15. 831 | 1, 380 |
| 1, 390 | 15. 831    | 15. 845 | 15. 859 | 15. 873 | 15. 886 | 15. 900 | 15. 914 | 15. 928 | 15. 942 | 15. 956 | 15. 969 | 1, 390 |
| 1, 400 | 15. 969    | 15. 983 | 15. 997 | 16. 011 | 16. 025 | 16. 039 | 16. 053 | 16. 067 | 16. 081 | 16. 095 | 16. 108 | 1, 400 |
| 1, 410 | 16. 108    | 16. 122 | 16. 136 | 16. 150 | 16. 164 | 16. 178 | 16. 192 | 16. 206 | 16. 219 | 16. 233 | 16. 247 | 1, 410 |
| 1, 420 | 16. 247    | 16. 261 | 16. 275 | 16. 289 | 16. 303 | 16. 317 | 16. 330 | 16. 344 | 16. 358 | 16. 372 | 16. 386 | 1, 420 |
| 1, 430 | 16. 386    | 16. 400 | 16. 414 | 16. 427 | 16. 441 | 16. 455 | 16. 469 | 16. 483 | 16. 497 | 16. 511 | 16. 524 | 1, 430 |
| 1, 440 | 16. 524    | 16. 538 | 16. 552 | 16. 566 | 16. 580 | 16. 594 | 16. 608 | 16. 621 | 16. 635 | 16. 649 | 16. 663 | 1, 440 |
| 1, 450 | 16. 663    | 16. 677 | 16. 691 | 16. 705 | 16. 719 | 16. 733 | 16. 746 | 16. 760 | 16. 774 | 16. 788 | 16. 802 | 1, 450 |
| 1, 460 | 16. 802    | 16. 816 | 16. 830 | 16. 844 | 16. 858 | 16. 872 | 16. 885 | 16. 899 | 16. 913 | 16. 927 | 16. 940 | 1, 460 |
| 1, 470 | 16. 940    | 16. 954 | 16. 968 | 16. 982 | 16. 996 | 17. 010 | 17. 024 | 17. 037 | 17. 051 | 17. 065 | 17. 079 | 1, 470 |
| 1, 480 | 17. 079    | 17. 092 | 17. 106 | 17. 120 | 17. 134 | 17. 148 | 17. 161 | 17. 175 | 17. 189 | 17. 203 | 17. 217 | 1, 480 |
| 1, 490 | 17. 217    | 17. 230 | 17. 244 | 17. 258 | 17. 272 | 17. 286 | 17. 299 | 17. 313 | 17. 327 | 17. 341 | 17. 355 | 1, 490 |
| 1, 500 | 17. 355    | 17. 368 | 17. 382 | 17. 396 | 17. 410 | 17. 424 | 17. 437 | 17. 451 | 17. 465 | 17. 479 | 17. 493 | 1, 500 |
| 1, 510 | 17. 493    | 17. 506 | 17. 520 | 17. 534 | 17. 547 | 17. 561 | 17. 575 | 17. 589 | 17. 603 | 17. 617 | 17. 631 | 1, 510 |
| 1, 520 | 17. 631    | 17. 644 | 17. 658 | 17. 672 | 17. 686 | 17. 699 | 17. 713 | 17. 726 | 17. 740 | 17. 754 | 17. 768 | 1, 520 |
| 1, 530 | 17. 768    | 17. 781 | 17. 795 | 17. 809 | 17. 823 | 17. 837 | 17. 850 | 17. 864 | 17. 878 | 17. 892 | 17. 906 | 1, 530 |
| 1, 540 | 17. 906    | 17. 919 | 17. 933 | 17. 947 | 17. 960 | 17. 974 | 17. 988 | 18. 002 | 18. 016 | 18. 029 | 18. 043 | 1, 540 |
| 1, 550 | 18. 043    | 18. 056 | 18. 070 | 18. 084 | 18. 098 | 18. 111 | 18. 125 | 18. 139 | 18. 152 | 18. 166 | 18. 179 | 1, 550 |
| 1, 560 | 18. 179    | 18. 193 | 18. 207 | 18. 220 | 18. 234 | 18. 248 | 18. 261 | 18. 275 | 18. 289 | 18. 303 | 18. 316 | 1, 560 |
| 1, 570 | 18. 316    | 18. 330 | 18. 344 | 18. 357 | 18. 371 | 18. 385 | 18. 399 | 18. 412 | 18. 426 | 18. 440 | 18. 453 | 1, 570 |
| 1, 580 | 18. 453    | 18. 467 | 18. 481 | 18. 494 | 18. 508 | 18. 522 | 18. 536 | 18. 549 | 18. 563 | 18. 576 | 18. 590 | 1, 580 |
| 1, 590 | 18. 590    | 18. 604 | 18. 618 | 18. 631 | 18. 645 | 18. 659 | 18. 672 | 18. 686 | 18. 700 | 18. 714 | 18. 727 | 1, 590 |
| 1, 600 | 18. 727    | 18. 741 | 18. 754 | 18. 768 | 18. 782 | 18. 796 | 18. 810 | 18. 823 | 18. 836 | 18. 850 | 18. 864 | 1, 600 |
| ° C    | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° C    |

**Table 4. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**  
 (Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| °C    | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °C    |
|-------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| 1,600 | Millivolts |        |        |        |        |        |        |        |        |        |        | 1,600 |
|       | 18.727     | 18.741 | 18.754 | 18.768 | 18.782 | 18.796 | 18.810 | 18.823 | 18.836 | 18.850 | 18.864 |       |
| 1,610 | 18.864     | 18.878 | 18.891 | 18.905 | 18.919 | 18.932 | 18.946 | 18.960 | 18.973 | 18.987 | 19.001 | 1,610 |
| 1,620 | 19.001     | 19.014 | 19.028 | 19.042 | 19.056 | 19.069 | 19.083 | 19.096 | 19.110 | 19.124 | 19.137 | 1,620 |
| 1,630 | 19.137     | 19.150 | 19.164 | 19.178 | 19.191 | 19.205 | 19.219 | 19.232 | 19.246 | 19.260 | 19.273 | 1,630 |
| 1,640 | 19.273     | 19.287 | 19.300 | 19.314 | 19.328 | 19.341 | 19.355 | 19.369 | 19.382 | 19.396 | 19.409 | 1,640 |
| 1,650 | 19.409     | 19.423 | 19.437 | 19.450 | 19.464 | 19.477 | 19.491 | 19.504 | 19.518 | 19.531 | 19.545 | 1,650 |
| 1,660 | 19.545     | 19.559 | 19.573 | 19.586 | 19.600 | 19.614 | 19.627 | 19.641 | 19.654 | 19.668 | 19.682 | 1,660 |
| 1,670 | 19.682     | 19.695 | 19.709 | 19.722 | 19.736 | 19.750 | 19.763 | 19.777 | 19.790 | 19.804 | 19.818 | 1,670 |
| 1,680 | 19.818     | 19.831 | 19.845 | 19.859 | 19.873 | 19.886 | 19.900 | 19.913 | 19.927 | 19.940 | 19.954 | 1,680 |
| 1,690 | 19.954     | 19.967 | 19.981 | 19.994 | 20.008 | 20.022 | 20.035 | 20.049 | 20.062 | 20.076 | 20.090 | 1,690 |
| °C    | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °C    |

# Table 5. Chromel-Alumel Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts | .00  | .10  | .20  | .30  | .40  | .50  | .60  | .70  | .80  | .90  | 1.00 | Millivolts |
|------------|------|------|------|------|------|------|------|------|------|------|------|------------|
| Degrees C  |      |      |      |      |      |      |      |      |      |      |      |            |
| -5.00      | -158 | -163 | -168 | -173 | -178 | -184 | -190 | -145 | -149 | -154 | -158 | -5.00      |
| -4.00      | -118 | -122 | -125 | -129 | -133 | -137 | -141 | -145 | -149 | -154 | -158 | -4.00      |
| -3.00      | -84  | -87  | -90  | -94  | -97  | -100 | -104 | -107 | -111 | -114 | -118 | -3.00      |
| -2.00      | -54  | -57  | -60  | -63  | -66  | -69  | -72  | -75  | -78  | -81  | -84  | -2.00      |
| -1.00      | -26  | -29  | -32  | -34  | -37  | -40  | -43  | -46  | -48  | -51  | -54  | -1.00      |
| (-)0.00    | 0    | -3   | -5   | -8   | -10  | -13  | -16  | -18  | -21  | -24  | -26  | (-)0.00    |
| (+)0.00    | 0    | 3    | 5    | 8    | 10   | 13   | 15   | 18   | 20   | 23   | 25   | (+)0.00    |
| 1.00       | 25   | 28   | 30   | 32   | 35   | 37   | 40   | 42   | 45   | 47   | 49   | 1.00       |
| 2.00       | 49   | 52   | 54   | 57   | 59   | 62   | 64   | 67   | 69   | 71   | 74   | 2.00       |
| 3.00       | 74   | 76   | 78   | 81   | 83   | 86   | 88   | 91   | 93   | 95   | 98   | 3.00       |
| 4.00       | 98   | 100  | 102  | 105  | 107  | 110  | 112  | 114  | 117  | 119  | 122  | 4.00       |
| 5.00       | 122  | 124  | 127  | 129  | 132  | 134  | 137  | 139  | 142  | 144  | 147  | 5.00       |
| 6.00       | 147  | 149  | 152  | 154  | 157  | 159  | 162  | 164  | 167  | 169  | 172  | 6.00       |
| 7.00       | 172  | 174  | 177  | 179  | 182  | 184  | 187  | 189  | 192  | 194  | 197  | 7.00       |
| 8.00       | 197  | 199  | 202  | 204  | 207  | 209  | 212  | 214  | 217  | 219  | 222  | 8.00       |
| 9.00       | 222  | 224  | 227  | 229  | 232  | 234  | 236  | 239  | 241  | 244  | 246  | 9.00       |
| 10.00      | 246  | 249  | 251  | 253  | 256  | 258  | 261  | 263  | 266  | 268  | 271  | 10.00      |
| 11.00      | 271  | 273  | 276  | 278  | 280  | 283  | 285  | 288  | 290  | 292  | 295  | 11.00      |
| 12.00      | 295  | 297  | 300  | 302  | 304  | 307  | 309  | 312  | 314  | 317  | 319  | 12.00      |
| 13.00      | 319  | 321  | 324  | 326  | 329  | 331  | 333  | 336  | 338  | 341  | 343  | 13.00      |
| 14.00      | 343  | 345  | 348  | 350  | 353  | 355  | 357  | 360  | 362  | 364  | 367  | 14.00      |
| 15.00      | 367  | 369  | 372  | 374  | 376  | 379  | 381  | 383  | 386  | 388  | 391  | 15.00      |
| 16.00      | 391  | 393  | 395  | 398  | 400  | 402  | 405  | 407  | 409  | 412  | 414  | 16.00      |
| 17.00      | 414  | 417  | 419  | 421  | 424  | 426  | 428  | 431  | 433  | 436  | 438  | 17.00      |
| 18.00      | 438  | 440  | 443  | 445  | 447  | 450  | 452  | 454  | 457  | 459  | 461  | 18.00      |
| 19.00      | 461  | 464  | 466  | 468  | 471  | 473  | 476  | 478  | 480  | 483  | 485  | 19.00      |
| 20.00      | 485  | 487  | 489  | 492  | 494  | 497  | 499  | 501  | 504  | 506  | 508  | 20.00      |
| 21.00      | 508  | 511  | 513  | 516  | 518  | 520  | 522  | 525  | 527  | 529  | 532  | 21.00      |
| 22.00      | 532  | 534  | 537  | 539  | 541  | 543  | 546  | 548  | 551  | 553  | 555  | 22.00      |
| 23.00      | 555  | 558  | 560  | 562  | 564  | 567  | 569  | 572  | 574  | 576  | 579  | 23.00      |
| 24.00      | 579  | 581  | 583  | 586  | 588  | 590  | 593  | 595  | 597  | 600  | 602  | 24.00      |
| 25.00      | 602  | 604  | 607  | 609  | 612  | 614  | 616  | 618  | 621  | 623  | 626  | 25.00      |
| 26.00      | 626  | 628  | 630  | 633  | 635  | 637  | 640  | 642  | 644  | 647  | 649  | 26.00      |
| 27.00      | 649  | 652  | 654  | 656  | 659  | 661  | 663  | 666  | 668  | 671  | 673  | 27.00      |
| 28.00      | 673  | 675  | 678  | 680  | 682  | 685  | 687  | 690  | 692  | 694  | 697  | 28.00      |
| 29.00      | 697  | 699  | 702  | 704  | 706  | 709  | 711  | 713  | 716  | 718  | 721  | 29.00      |
| 30.00      | 721  | 723  | 725  | 728  | 730  | 733  | 735  | 737  | 740  | 742  | 744  | 30.00      |
| Millivolts | .00  | .10  | .20  | .30  | .40  | .50  | .60  | .70  | .80  | .90  | 1.00 | Millivolts |



# Table 5. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts | .00   | .10   | .20   | .30   | .40   | .50   | .60   | .70   | .80   | .90   | 1.00  | Millivolts |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| Degrees C  |       |       |       |       |       |       |       |       |       |       |       |            |
| 30.00      | 721   | 723   | 725   | 728   | 730   | 733   | 735   | 737   | 740   | 742   | 744   | 30.00      |
| 31.00      | 744   | 747   | 749   | 752   | 754   | 757   | 759   | 761   | 764   | 766   | 768   | 31.00      |
| 32.00      | 768   | 771   | 773   | 776   | 778   | 781   | 783   | 786   | 788   | 790   | 793   | 32.00      |
| 33.00      | 793   | 795   | 798   | 800   | 802   | 805   | 807   | 810   | 812   | 815   | 817   | 33.00      |
| 34.00      | 817   | 819   | 822   | 824   | 827   | 829   | 832   | 834   | 837   | 839   | 842   | 34.00      |
| 35.00      | 842   | 844   | 847   | 849   | 852   | 854   | 856   | 859   | 861   | 864   | 866   | 35.00      |
| 36.00      | 866   | 869   | 871   | 874   | 876   | 879   | 881   | 884   | 886   | 889   | 891   | 36.00      |
| 37.00      | 891   | 894   | 896   | 899   | 901   | 904   | 906   | 908   | 911   | 913   | 916   | 37.00      |
| 38.00      | 916   | 918   | 921   | 923   | 926   | 928   | 931   | 933   | 936   | 938   | 941   | 38.00      |
| 39.00      | 941   | 944   | 946   | 949   | 951   | 954   | 956   | 959   | 961   | 964   | 967   | 39.00      |
| 40.00      | 967   | 969   | 972   | 974   | 977   | 979   | 982   | 984   | 987   | 989   | 992   | 40.00      |
| 41.00      | 992   | 994   | 997   | 1,000 | 1,002 | 1,005 | 1,007 | 1,010 | 1,012 | 1,015 | 1,018 | 41.00      |
| 42.00      | 1,018 | 1,020 | 1,023 | 1,025 | 1,028 | 1,031 | 1,033 | 1,036 | 1,038 | 1,041 | 1,044 | 42.00      |
| 43.00      | 1,044 | 1,046 | 1,049 | 1,051 | 1,054 | 1,057 | 1,059 | 1,062 | 1,064 | 1,067 | 1,069 | 43.00      |
| 44.00      | 1,069 | 1,072 | 1,075 | 1,077 | 1,080 | 1,083 | 1,085 | 1,088 | 1,091 | 1,093 | 1,096 | 44.00      |
| 45.00      | 1,096 | 1,098 | 1,101 | 1,104 | 1,106 | 1,109 | 1,112 | 1,114 | 1,117 | 1,119 | 1,122 | 45.00      |
| 46.00      | 1,122 | 1,125 | 1,128 | 1,130 | 1,133 | 1,136 | 1,138 | 1,141 | 1,143 | 1,146 | 1,149 | 46.00      |
| 47.00      | 1,149 | 1,152 | 1,154 | 1,157 | 1,160 | 1,162 | 1,165 | 1,168 | 1,171 | 1,173 | 1,176 | 47.00      |
| 48.00      | 1,176 | 1,179 | 1,181 | 1,184 | 1,187 | 1,189 | 1,192 | 1,195 | 1,198 | 1,200 | 1,203 | 48.00      |
| 49.00      | 1,203 | 1,206 | 1,208 | 1,211 | 1,214 | 1,217 | 1,219 | 1,222 | 1,225 | 1,228 | 1,231 | 49.00      |
| 50.00      | 1,231 | 1,233 | 1,236 | 1,239 | 1,242 | 1,244 | 1,247 | 1,250 | 1,253 | 1,256 | 1,258 | 50.00      |
| 51.00      | 1,258 | 1,261 | 1,264 | 1,267 | 1,270 | 1,273 | 1,276 | 1,278 | 1,281 | 1,284 | 1,287 | 51.00      |
| 52.00      | 1,287 | 1,290 | 1,293 | 1,295 | 1,298 | 1,301 | 1,304 | 1,307 | 1,310 | 1,313 | 1,315 | 52.00      |
| 53.00      | 1,315 | 1,318 | 1,321 | 1,324 | 1,327 | 1,330 | 1,333 | 1,336 | 1,338 | 1,341 | 1,344 | 53.00      |
| 54.00      | 1,344 | 1,347 | 1,350 | 1,353 | 1,356 | 1,359 | 1,362 | 1,365 | 1,368 | 1,371 | 1,374 | 54.00      |
| Millivolts | .00   | .10   | .20   | .30   | .40   | .50   | .60   | .70   | .80   | .90   | 1.00  | Millivolts |

# Table 6. Chromel-Alumel Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| ° C  | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° C  |
|------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
|      | Millivolts |       |       |       |       |       |       |       |       |       |       |      |
| -190 | -5.60      | -5.62 | -5.63 | -5.65 | -5.67 | -5.68 | -5.70 | -5.71 | -5.73 | -5.74 | -5.75 | -190 |
| -180 | -5.43      | -5.45 | -5.46 | -5.48 | -5.50 | -5.52 | -5.53 | -5.55 | -5.57 | -5.58 | -5.60 | -180 |
| -170 | -5.24      | -5.26 | -5.28 | -5.30 | -5.32 | -5.34 | -5.35 | -5.37 | -5.39 | -5.41 | -5.43 | -170 |
| -160 | -5.03      | -5.05 | -5.08 | -5.10 | -5.12 | -5.14 | -5.16 | -5.18 | -5.20 | -5.22 | -5.24 | -160 |
| -150 | -4.81      | -4.84 | -4.86 | -4.88 | -4.90 | -4.92 | -4.95 | -4.97 | -4.99 | -5.01 | -5.03 | -150 |
| -140 | -4.58      | -4.60 | -4.62 | -4.65 | -4.67 | -4.70 | -4.72 | -4.74 | -4.77 | -4.79 | -4.81 | -140 |
| -130 | -4.32      | -4.35 | -4.37 | -4.40 | -4.42 | -4.45 | -4.48 | -4.50 | -4.52 | -4.55 | -4.58 | -130 |
| -120 | -4.06      | -4.08 | -4.11 | -4.14 | -4.16 | -4.19 | -4.22 | -4.24 | -4.27 | -4.30 | -4.32 | -120 |
| -110 | -3.78      | -3.81 | -3.84 | -3.86 | -3.89 | -3.92 | -3.95 | -3.98 | -4.00 | -4.03 | -4.06 | -110 |
| -100 | -3.49      | -3.52 | -3.55 | -3.58 | -3.61 | -3.64 | -3.66 | -3.69 | -3.72 | -3.75 | -3.78 | -100 |
| -90  | -3.19      | -3.22 | -3.25 | -3.28 | -3.31 | -3.34 | -3.37 | -3.40 | -3.43 | -3.46 | -3.49 | -90  |
| -80  | -2.87      | -2.90 | -2.93 | -2.96 | -3.00 | -3.03 | -3.06 | -3.09 | -3.12 | -3.16 | -3.19 | -80  |
| -70  | -2.54      | -2.57 | -2.61 | -2.64 | -2.67 | -2.71 | -2.74 | -2.77 | -2.80 | -2.84 | -2.87 | -70  |
| -60  | -2.20      | -2.24 | -2.27 | -2.30 | -2.34 | -2.37 | -2.41 | -2.44 | -2.47 | -2.51 | -2.54 | -60  |
| -50  | -1.86      | -1.89 | -1.93 | -1.96 | -2.00 | -2.03 | -2.07 | -2.10 | -2.13 | -2.17 | -2.20 | -50  |
| -40  | -1.50      | -1.54 | -1.57 | -1.61 | -1.64 | -1.68 | -1.72 | -1.75 | -1.79 | -1.82 | -1.86 | -40  |
| -30  | -1.14      | -1.17 | -1.21 | -1.25 | -1.28 | -1.32 | -1.36 | -1.39 | -1.43 | -1.47 | -1.50 | -30  |
| -20  | -0.77      | -0.80 | -0.84 | -0.88 | -0.92 | -0.95 | -0.99 | -1.03 | -1.06 | -1.10 | -1.14 | -20  |
| -10  | -0.39      | -0.42 | -0.46 | -0.50 | -0.54 | -0.58 | -0.62 | -0.66 | -0.69 | -0.73 | -0.77 | -10  |
| (-)0 | -0.00      | -0.04 | -0.08 | -0.12 | -0.16 | -0.19 | -0.23 | -0.27 | -0.31 | -0.35 | -0.39 | (-)0 |
| (+)0 | 0.00       | 0.04  | 0.08  | 0.12  | 0.16  | 0.20  | 0.24  | 0.28  | 0.32  | 0.36  | 0.40  | (+)0 |
| 10   | 0.40       | 0.44  | 0.48  | 0.52  | 0.56  | 0.60  | 0.64  | 0.68  | 0.72  | 0.76  | 0.80  | 10   |
| 20   | 0.80       | 0.84  | 0.88  | 0.92  | 0.96  | 1.00  | 1.04  | 1.08  | 1.12  | 1.16  | 1.20  | 20   |
| 30   | 1.20       | 1.24  | 1.28  | 1.32  | 1.36  | 1.40  | 1.44  | 1.49  | 1.53  | 1.57  | 1.61  | 30   |
| 40   | 1.61       | 1.65  | 1.69  | 1.73  | 1.77  | 1.81  | 1.85  | 1.90  | 1.94  | 1.98  | 2.02  | 40   |
| 50   | 2.02       | 2.06  | 2.10  | 2.14  | 2.18  | 2.23  | 2.27  | 2.31  | 2.35  | 2.39  | 2.43  | 50   |
| 60   | 2.43       | 2.47  | 2.51  | 2.56  | 2.60  | 2.64  | 2.68  | 2.72  | 2.76  | 2.80  | 2.85  | 60   |
| 70   | 2.85       | 2.89  | 2.93  | 2.97  | 3.01  | 3.05  | 3.10  | 3.14  | 3.18  | 3.22  | 3.26  | 70   |
| 80   | 3.26       | 3.30  | 3.35  | 3.39  | 3.43  | 3.47  | 3.51  | 3.56  | 3.60  | 3.64  | 3.68  | 80   |
| 90   | 3.68       | 3.72  | 3.76  | 3.81  | 3.85  | 3.89  | 3.93  | 3.97  | 4.01  | 4.06  | 4.10  | 90   |
| 100  | 4.10       | 4.14  | 4.18  | 4.22  | 4.26  | 4.31  | 4.35  | 4.39  | 4.43  | 4.47  | 4.51  | 100  |
| 110  | 4.51       | 4.55  | 4.60  | 4.64  | 4.68  | 4.72  | 4.76  | 4.80  | 4.84  | 4.88  | 4.92  | 110  |
| 120  | 4.92       | 4.96  | 5.01  | 5.05  | 5.09  | 5.13  | 5.17  | 5.21  | 5.25  | 5.29  | 5.33  | 120  |
| 130  | 5.33       | 5.37  | 5.41  | 5.45  | 5.49  | 5.53  | 5.57  | 5.61  | 5.65  | 5.69  | 5.73  | 130  |
| 140  | 5.73       | 5.77  | 5.81  | 5.85  | 5.89  | 5.93  | 5.97  | 6.01  | 6.05  | 6.09  | 6.13  | 140  |
| 150  | 6.13       | 6.17  | 6.21  | 6.25  | 6.29  | 6.33  | 6.37  | 6.41  | 6.45  | 6.49  | 6.53  | 150  |
| 160  | 6.53       | 6.57  | 6.61  | 6.65  | 6.69  | 6.73  | 6.77  | 6.81  | 6.85  | 6.89  | 6.93  | 160  |
| 170  | 6.93       | 6.97  | 7.01  | 7.05  | 7.09  | 7.13  | 7.17  | 7.21  | 7.25  | 7.29  | 7.33  | 170  |
| 180  | 7.33       | 7.37  | 7.41  | 7.45  | 7.49  | 7.53  | 7.57  | 7.61  | 7.65  | 7.69  | 7.73  | 180  |
| 190  | 7.73       | 7.77  | 7.81  | 7.85  | 7.89  | 7.93  | 7.97  | 8.01  | 8.05  | 8.09  | 8.13  | 190  |
| 200  | 8.13       | 8.17  | 8.21  | 8.25  | 8.29  | 8.33  | 8.37  | 8.41  | 8.46  | 8.50  | 8.54  | 200  |
| ° C  | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° C  |

# Table 6. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| ° C | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° C |
|-----|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|     | Millivolts |       |       |       |       |       |       |       |       |       |       |     |
| 200 | 8.13       | 8.17  | 8.21  | 8.25  | 8.29  | 8.33  | 8.37  | 8.41  | 8.46  | 8.50  | 8.54  | 200 |
| 210 | 8.54       | 8.58  | 8.62  | 8.66  | 8.70  | 8.74  | 8.78  | 8.82  | 8.86  | 8.90  | 8.94  | 210 |
| 220 | 8.94       | 8.98  | 9.02  | 9.06  | 9.10  | 9.14  | 9.18  | 9.22  | 9.26  | 9.30  | 9.34  | 220 |
| 230 | 9.34       | 9.38  | 9.42  | 9.46  | 9.50  | 9.54  | 9.59  | 9.63  | 9.67  | 9.71  | 9.75  | 230 |
| 240 | 9.75       | 9.79  | 9.83  | 9.87  | 9.91  | 9.95  | 9.99  | 10.03 | 10.07 | 10.11 | 10.16 | 240 |
| 250 | 10.16      | 10.20 | 10.24 | 10.28 | 10.32 | 10.36 | 10.40 | 10.44 | 10.48 | 10.52 | 10.57 | 250 |
| 260 | 10.57      | 10.61 | 10.65 | 10.69 | 10.73 | 10.77 | 10.81 | 10.85 | 10.89 | 10.93 | 10.98 | 260 |
| 270 | 10.98      | 11.02 | 11.06 | 11.10 | 11.14 | 11.18 | 11.22 | 11.26 | 11.30 | 11.34 | 11.39 | 270 |
| 280 | 11.39      | 11.43 | 11.47 | 11.51 | 11.55 | 11.59 | 11.63 | 11.67 | 11.72 | 11.76 | 11.80 | 280 |
| 290 | 11.80      | 11.84 | 11.88 | 11.92 | 11.96 | 12.01 | 12.05 | 12.09 | 12.13 | 12.17 | 12.21 | 290 |
| 300 | 12.21      | 12.25 | 12.29 | 12.34 | 12.38 | 12.42 | 12.46 | 12.50 | 12.54 | 12.58 | 12.63 | 300 |
| 310 | 12.63      | 12.67 | 12.71 | 12.75 | 12.79 | 12.83 | 12.88 | 12.92 | 12.96 | 13.00 | 13.04 | 310 |
| 320 | 13.04      | 13.08 | 13.12 | 13.17 | 13.21 | 13.25 | 13.29 | 13.33 | 13.37 | 13.42 | 13.46 | 320 |
| 330 | 13.46      | 13.50 | 13.54 | 13.58 | 13.62 | 13.67 | 13.71 | 13.75 | 13.79 | 13.83 | 13.88 | 330 |
| 340 | 13.88      | 13.92 | 13.96 | 14.00 | 14.04 | 14.09 | 14.13 | 14.17 | 14.21 | 14.25 | 14.29 | 340 |
| 350 | 14.29      | 14.34 | 14.38 | 14.42 | 14.46 | 14.50 | 14.55 | 14.59 | 14.63 | 14.67 | 14.71 | 350 |
| 360 | 14.71      | 14.76 | 14.80 | 14.84 | 14.88 | 14.92 | 14.97 | 15.01 | 15.05 | 15.09 | 15.13 | 360 |
| 370 | 15.13      | 15.18 | 15.22 | 15.26 | 15.30 | 15.34 | 15.39 | 15.43 | 15.47 | 15.51 | 15.55 | 370 |
| 380 | 15.55      | 15.60 | 15.64 | 15.68 | 15.72 | 15.76 | 15.81 | 15.85 | 15.89 | 15.93 | 15.98 | 380 |
| 390 | 15.98      | 16.02 | 16.06 | 16.10 | 16.14 | 16.19 | 16.23 | 16.27 | 16.31 | 16.36 | 16.40 | 390 |
| 400 | 16.40      | 16.44 | 16.48 | 16.52 | 16.57 | 16.61 | 16.65 | 16.69 | 16.74 | 16.78 | 16.82 | 400 |
| 410 | 16.82      | 16.86 | 16.91 | 16.95 | 16.99 | 17.03 | 17.07 | 17.12 | 17.16 | 17.20 | 17.24 | 410 |
| 420 | 17.24      | 17.29 | 17.33 | 17.37 | 17.41 | 17.46 | 17.50 | 17.54 | 17.58 | 17.62 | 17.67 | 420 |
| 430 | 17.67      | 17.71 | 17.75 | 17.79 | 17.84 | 17.88 | 17.92 | 17.96 | 18.01 | 18.05 | 18.09 | 430 |
| 440 | 18.09      | 18.13 | 18.17 | 18.22 | 18.26 | 18.30 | 18.34 | 18.39 | 18.43 | 18.47 | 18.51 | 440 |
| 450 | 18.51      | 18.56 | 18.60 | 18.64 | 18.68 | 18.73 | 18.77 | 18.81 | 18.85 | 18.90 | 18.94 | 450 |
| 460 | 18.94      | 18.98 | 19.02 | 19.07 | 19.11 | 19.15 | 19.19 | 19.24 | 19.28 | 19.32 | 19.36 | 460 |
| 470 | 19.36      | 19.41 | 19.45 | 19.49 | 19.54 | 19.58 | 19.62 | 19.66 | 19.71 | 19.75 | 19.79 | 470 |
| 480 | 19.79      | 19.84 | 19.88 | 19.92 | 19.96 | 20.01 | 20.05 | 20.09 | 20.13 | 20.18 | 20.22 | 480 |
| 490 | 20.22      | 20.26 | 20.31 | 20.35 | 20.39 | 20.43 | 20.48 | 20.52 | 20.56 | 20.60 | 20.65 | 490 |
| 500 | 20.65      | 20.69 | 20.73 | 20.77 | 20.82 | 20.86 | 20.90 | 20.94 | 20.99 | 21.03 | 21.07 | 500 |
| 510 | 21.07      | 21.11 | 21.16 | 21.20 | 21.24 | 21.28 | 21.32 | 21.37 | 21.41 | 21.45 | 21.50 | 510 |
| 520 | 21.50      | 21.54 | 21.58 | 21.63 | 21.67 | 21.71 | 21.75 | 21.80 | 21.84 | 21.88 | 21.92 | 520 |
| 530 | 21.92      | 21.97 | 22.01 | 22.05 | 22.09 | 22.14 | 22.18 | 22.22 | 22.26 | 22.31 | 22.35 | 530 |
| 540 | 22.35      | 22.39 | 22.43 | 22.48 | 22.52 | 22.56 | 22.61 | 22.65 | 22.69 | 22.73 | 22.78 | 540 |
| 550 | 22.78      | 22.82 | 22.86 | 22.90 | 22.95 | 22.99 | 23.03 | 23.07 | 23.12 | 23.16 | 23.20 | 550 |
| 560 | 23.20      | 23.25 | 23.29 | 23.33 | 23.38 | 23.42 | 23.46 | 23.50 | 23.54 | 23.59 | 23.63 | 560 |
| 570 | 23.63      | 23.67 | 23.72 | 23.76 | 23.80 | 23.84 | 23.89 | 23.93 | 23.97 | 24.01 | 24.06 | 570 |
| 580 | 24.06      | 24.10 | 24.14 | 24.18 | 24.23 | 24.27 | 24.31 | 24.36 | 24.40 | 24.44 | 24.49 | 580 |
| 590 | 24.49      | 24.53 | 24.57 | 24.61 | 24.65 | 24.70 | 24.74 | 24.78 | 24.83 | 24.87 | 24.91 | 590 |
| 600 | 24.91      | 24.95 | 25.00 | 25.04 | 25.08 | 25.12 | 25.17 | 25.21 | 25.25 | 25.29 | 25.34 | 600 |
| ° C | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° C |



# Table 6. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| °C    | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °C    |
|-------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 600   | Millivolts |       |       |       |       |       |       |       |       |       |       | 600   |
|       | 24.91      | 24.95 | 25.00 | 25.04 | 25.08 | 25.12 | 25.17 | 25.21 | 25.25 | 25.29 | 25.34 |       |
|       | 25.34      | 25.38 | 25.42 | 25.47 | 25.51 | 25.55 | 25.59 | 25.64 | 25.68 | 25.72 | 25.76 |       |
|       | 25.76      | 25.81 | 25.85 | 25.89 | 25.93 | 25.98 | 26.02 | 26.06 | 26.10 | 26.15 | 26.19 |       |
|       | 26.19      | 26.23 | 26.27 | 26.32 | 26.36 | 26.40 | 26.44 | 26.48 | 26.53 | 26.57 | 26.61 |       |
|       | 26.61      | 26.65 | 26.70 | 26.74 | 26.78 | 26.82 | 26.86 | 26.91 | 26.95 | 26.99 | 27.03 |       |
|       | 27.03      | 27.07 | 27.12 | 27.16 | 27.20 | 27.24 | 27.28 | 27.33 | 27.37 | 27.41 | 27.45 |       |
|       | 27.45      | 27.49 | 27.54 | 27.58 | 27.62 | 27.66 | 27.71 | 27.75 | 27.79 | 27.83 | 27.87 |       |
|       | 27.87      | 27.92 | 27.96 | 28.00 | 28.04 | 28.08 | 28.13 | 28.17 | 28.21 | 28.25 | 28.29 |       |
|       | 28.29      | 28.34 | 28.38 | 28.42 | 28.46 | 28.50 | 28.55 | 28.59 | 28.63 | 28.67 | 28.72 |       |
| 690   | 28.72      | 28.76 | 28.80 | 28.84 | 28.88 | 28.93 | 28.97 | 29.01 | 29.05 | 29.10 | 29.14 | 690   |
| 700   | 29.14      | 29.18 | 29.22 | 29.26 | 29.30 | 29.35 | 29.39 | 29.43 | 29.47 | 29.52 | 29.56 | 700   |
| 710   | 29.56      | 29.60 | 29.64 | 29.68 | 29.72 | 29.77 | 29.81 | 29.85 | 29.89 | 29.93 | 29.97 | 710   |
| 720   | 29.97      | 30.02 | 30.06 | 30.10 | 30.14 | 30.18 | 30.23 | 30.27 | 30.31 | 30.35 | 30.39 | 720   |
| 730   | 30.39      | 30.44 | 30.48 | 30.52 | 30.56 | 30.60 | 30.65 | 30.69 | 30.73 | 30.77 | 30.81 | 730   |
| 740   | 30.81      | 30.85 | 30.90 | 30.94 | 30.98 | 31.02 | 31.06 | 31.10 | 31.15 | 31.19 | 31.23 | 740   |
| 750   | 31.23      | 31.27 | 31.31 | 31.35 | 31.40 | 31.44 | 31.48 | 31.52 | 31.56 | 31.60 | 31.65 | 750   |
| 760   | 31.65      | 31.69 | 31.73 | 31.77 | 31.81 | 31.85 | 31.90 | 31.94 | 31.98 | 32.02 | 32.06 | 760   |
| 770   | 32.06      | 32.10 | 32.15 | 32.19 | 32.23 | 32.27 | 32.31 | 32.35 | 32.39 | 32.43 | 32.48 | 770   |
| 780   | 32.48      | 32.52 | 32.56 | 32.60 | 32.64 | 32.68 | 32.72 | 32.76 | 32.81 | 32.85 | 32.89 | 780   |
| 790   | 32.89      | 32.93 | 32.97 | 33.01 | 33.05 | 33.09 | 33.13 | 33.18 | 33.22 | 33.26 | 33.30 | 790   |
| 800   | 33.30      | 33.34 | 33.38 | 33.42 | 33.46 | 33.50 | 33.54 | 33.59 | 33.63 | 33.67 | 33.71 | 800   |
| 810   | 33.71      | 33.75 | 33.79 | 33.83 | 33.87 | 33.91 | 33.95 | 33.99 | 34.04 | 34.08 | 34.12 | 810   |
| 820   | 34.12      | 34.16 | 34.20 | 34.24 | 34.28 | 34.32 | 34.36 | 34.40 | 34.44 | 34.48 | 34.53 | 820   |
| 830   | 34.53      | 34.57 | 34.61 | 34.65 | 34.69 | 34.73 | 34.77 | 34.81 | 34.85 | 34.89 | 34.93 | 830   |
| 840   | 34.93      | 34.97 | 35.02 | 35.06 | 35.10 | 35.14 | 35.18 | 35.22 | 35.26 | 35.30 | 35.34 | 840   |
| 850   | 35.34      | 35.38 | 35.42 | 35.46 | 35.50 | 35.54 | 35.58 | 35.63 | 35.67 | 35.71 | 35.75 | 850   |
| 860   | 35.75      | 35.79 | 35.83 | 35.87 | 35.91 | 35.95 | 35.99 | 36.03 | 36.07 | 36.11 | 36.15 | 860   |
| 870   | 36.15      | 36.19 | 36.23 | 36.27 | 36.31 | 36.35 | 36.39 | 36.43 | 36.47 | 36.51 | 36.55 | 870   |
| 880   | 36.55      | 36.59 | 36.63 | 36.67 | 36.72 | 36.76 | 36.80 | 36.84 | 36.88 | 36.92 | 36.96 | 880   |
| 890   | 36.96      | 37.00 | 37.04 | 37.08 | 37.12 | 37.16 | 37.20 | 37.24 | 37.28 | 37.32 | 37.36 | 890   |
| 900   | 37.36      | 37.40 | 37.44 | 37.48 | 37.52 | 37.56 | 37.60 | 37.64 | 37.68 | 37.72 | 37.76 | 900   |
| 910   | 37.76      | 37.80 | 37.84 | 37.88 | 37.92 | 37.96 | 38.00 | 38.04 | 38.08 | 38.12 | 38.16 | 910   |
| 920   | 38.16      | 38.20 | 38.24 | 38.28 | 38.32 | 38.36 | 38.40 | 38.44 | 38.48 | 38.52 | 38.56 | 920   |
| 930   | 38.56      | 38.60 | 38.64 | 38.68 | 38.72 | 38.76 | 38.80 | 38.84 | 38.88 | 38.92 | 38.95 | 930   |
| 940   | 38.95      | 38.99 | 39.03 | 39.07 | 39.11 | 39.15 | 39.19 | 39.23 | 39.27 | 39.31 | 39.35 | 940   |
| 950   | 39.35      | 39.39 | 39.43 | 39.47 | 39.51 | 39.55 | 39.59 | 39.63 | 39.67 | 39.71 | 39.75 | 950   |
| 960   | 39.75      | 39.79 | 39.83 | 39.86 | 39.90 | 39.94 | 39.98 | 40.02 | 40.06 | 40.10 | 40.14 | 960   |
| 970   | 40.14      | 40.18 | 40.22 | 40.26 | 40.30 | 40.34 | 40.38 | 40.41 | 40.45 | 40.49 | 40.53 | 970   |
| 980   | 40.53      | 40.57 | 40.61 | 40.65 | 40.69 | 40.73 | 40.77 | 40.81 | 40.85 | 40.89 | 40.92 | 980   |
| 990   | 40.92      | 40.96 | 41.00 | 41.04 | 41.08 | 41.12 | 41.16 | 41.20 | 41.24 | 41.28 | 41.31 | 990   |
| 1,000 | 41.31      | 41.35 | 41.39 | 41.43 | 41.47 | 41.51 | 41.55 | 41.59 | 41.63 | 41.67 | 41.70 | 1,000 |
| °C    | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °C    |

# Table 6. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrec C (Int. 1948). Reference Junctions at 0° C.)

| ° C                                                                                                      | 0                          | 1                          | 2                          | 3                          | 4                          | 5                          | 6                          | 7                          | 8                          | 9                          | 10                         | ° C                                                                                                      |
|----------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------------------------------------------------------------------------------------|
| 1, 000<br>1, 010<br>1, 020<br>1, 030<br><br>1, 040<br>1, 050<br>1, 060<br><br>1, 070<br>1, 080<br>1, 090 | Millivolts                 |                            |                            |                            |                            |                            |                            |                            |                            |                            |                            | 1, 000<br>1, 010<br>1, 020<br>1, 030<br><br>1, 040<br>1, 050<br>1, 060<br><br>1, 070<br>1, 080<br>1, 090 |
|                                                                                                          | 41. 31                     | 41. 35                     | 41. 39                     | 41. 43                     | 41. 47                     | 41. 51                     | 41. 55                     | 41. 59                     | 41. 63                     | 41. 67                     | 41. 70                     |                                                                                                          |
|                                                                                                          | 41. 70                     | 41. 74                     | 41. 78                     | 41. 82                     | 41. 86                     | 41. 90                     | 41. 94                     | 41. 98                     | 42. 02                     | 42. 05                     | 42. 09                     |                                                                                                          |
|                                                                                                          | 42. 09                     | 42. 13                     | 42. 17                     | 42. 21                     | 42. 25                     | 42. 29                     | 42. 33                     | 42. 36                     | 42. 40                     | 42. 44                     | 42. 48                     |                                                                                                          |
|                                                                                                          | 42. 48                     | 42. 52                     | 42. 56                     | 42. 60                     | 42. 63                     | 42. 67                     | 42. 71                     | 42. 75                     | 42. 79                     | 42. 83                     | 42. 87                     |                                                                                                          |
|                                                                                                          | 42. 87                     | 42. 90                     | 42. 94                     | 42. 98                     | 43. 02                     | 43. 06                     | 43. 10                     | 43. 14                     | 43. 17                     | 43. 21                     | 43. 25                     |                                                                                                          |
|                                                                                                          | 43. 25                     | 43. 29                     | 43. 33                     | 43. 37                     | 43. 41                     | 43. 44                     | 43. 48                     | 43. 52                     | 43. 56                     | 43. 60                     | 43. 63                     |                                                                                                          |
|                                                                                                          | 43. 63                     | 43. 67                     | 43. 71                     | 43. 75                     | 43. 79                     | 43. 83                     | 43. 87                     | 43. 90                     | 43. 94                     | 43. 98                     | 44. 02                     |                                                                                                          |
|                                                                                                          | 44. 02                     | 44. 06                     | 44. 10                     | 44. 13                     | 44. 17                     | 44. 21                     | 44. 25                     | 44. 29                     | 44. 33                     | 44. 36                     | 44. 40                     |                                                                                                          |
|                                                                                                          | 44. 40                     | 44. 44                     | 44. 48                     | 44. 52                     | 44. 55                     | 44. 59                     | 44. 63                     | 44. 67                     | 44. 71                     | 44. 74                     | 44. 78                     |                                                                                                          |
|                                                                                                          | 44. 78                     | 44. 82                     | 44. 86                     | 44. 90                     | 44. 93                     | 44. 97                     | 45. 01                     | 45. 05                     | 45. 09                     | 45. 12                     | 45. 16                     |                                                                                                          |
| 1, 100                                                                                                   | 45. 16                     | 45. 20                     | 45. 24                     | 45. 27                     | 45. 31                     | 45. 35                     | 45. 39                     | 45. 43                     | 45. 46                     | 45. 50                     | 45. 54                     | 1, 100                                                                                                   |
| 1, 110<br>1, 120<br>1, 130                                                                               | 45. 54<br>45. 92<br>46. 29 | 45. 58<br>45. 96<br>46. 33 | 45. 62<br>45. 99<br>46. 37 | 45. 65<br>46. 03<br>46. 41 | 45. 69<br>46. 07<br>46. 44 | 45. 73<br>46. 11<br>46. 48 | 45. 77<br>46. 14<br>46. 52 | 45. 80<br>46. 18<br>46. 56 | 45. 84<br>46. 22<br>46. 59 | 45. 88<br>46. 26<br>46. 63 | 45. 92<br>46. 29<br>46. 67 | 1, 110<br>1, 120<br>1, 130                                                                               |
| 1, 140<br>1, 150<br>1, 160                                                                               | 46. 67<br>47. 04<br>47. 41 | 46. 70<br>47. 08<br>47. 45 | 46. 74<br>47. 12<br>47. 49 | 46. 78<br>47. 15<br>47. 52 | 46. 82<br>47. 19<br>47. 56 | 46. 85<br>47. 23<br>47. 60 | 46. 89<br>47. 26<br>47. 63 | 46. 93<br>47. 30<br>47. 67 | 46. 97<br>47. 34<br>47. 71 | 47. 00<br>47. 38<br>47. 75 | 47. 04<br>47. 41<br>47. 78 | 1, 140<br>1, 150<br>1, 160                                                                               |
| 1, 170<br>1, 180<br>1, 190                                                                               | 47. 78<br>48. 15<br>48. 52 | 47. 82<br>48. 19<br>48. 56 | 47. 86<br>48. 23<br>48. 59 | 47. 89<br>48. 26<br>48. 63 | 47. 93<br>48. 30<br>48. 67 | 47. 97<br>48. 34<br>48. 70 | 48. 00<br>48. 37<br>48. 74 | 48. 04<br>48. 41<br>48. 78 | 48. 08<br>48. 45<br>48. 81 | 48. 12<br>48. 48<br>48. 85 | 48. 15<br>48. 52<br>48. 89 | 1, 170<br>1, 180<br>1, 190                                                                               |
| 1, 200                                                                                                   | 48. 89                     | 48. 92                     | 48. 96                     | 49. 00                     | 49. 03                     | 49. 07                     | 49. 11                     | 49. 14                     | 49. 18                     | 49. 22                     | 49. 25                     | 1, 200                                                                                                   |
| 1, 210<br>1, 220<br>1, 230                                                                               | 49. 25<br>49. 62<br>49. 98 | 49. 29<br>49. 65<br>50. 01 | 49. 32<br>49. 69<br>50. 05 | 49. 36<br>49. 72<br>50. 08 | 49. 40<br>49. 76<br>50. 12 | 49. 43<br>49. 80<br>50. 16 | 49. 47<br>49. 83<br>50. 19 | 49. 51<br>49. 87<br>50. 23 | 49. 54<br>49. 90<br>50. 26 | 49. 58<br>49. 94<br>50. 30 | 49. 62<br>49. 98<br>50. 34 | 1, 210<br>1, 220<br>1, 230                                                                               |
| 1, 240<br>1, 250<br>1, 260                                                                               | 50. 34<br>50. 69<br>51. 05 | 50. 37<br>50. 73<br>51. 09 | 50. 41<br>50. 77<br>51. 12 | 50. 44<br>50. 80<br>51. 16 | 50. 48<br>50. 84<br>51. 19 | 50. 52<br>50. 87<br>51. 23 | 50. 55<br>50. 91<br>51. 27 | 50. 59<br>50. 94<br>51. 30 | 50. 62<br>50. 98<br>51. 34 | 50. 66<br>51. 02<br>51. 37 | 50. 69<br>51. 05<br>51. 41 | 1, 240<br>1, 250<br>1, 260                                                                               |
| 1, 270<br>1, 280<br>1, 290                                                                               | 51. 41<br>51. 76<br>52. 11 | 51. 44<br>51. 80<br>52. 15 | 51. 48<br>51. 83<br>52. 18 | 51. 51<br>51. 87<br>52. 22 | 51. 55<br>51. 90<br>52. 25 | 51. 58<br>51. 94<br>52. 29 | 51. 62<br>51. 97<br>52. 32 | 51. 66<br>52. 01<br>52. 36 | 51. 69<br>52. 04<br>52. 39 | 51. 73<br>52. 08<br>52. 43 | 51. 76<br>52. 11<br>52. 46 | 1, 270<br>1, 280<br>1, 290                                                                               |
| 1, 300                                                                                                   | 52. 46                     | 52. 50                     | 52. 53                     | 52. 57                     | 52. 60                     | 52. 64                     | 52. 67                     | 52. 71                     | 52. 74                     | 52. 78                     | 52. 81                     | 1, 300                                                                                                   |
| 1, 310<br>1, 320<br>1, 330                                                                               | 52. 81<br>53. 16<br>53. 51 | 52. 85<br>53. 20<br>53. 54 | 52. 88<br>53. 23<br>53. 58 | 52. 92<br>53. 27<br>53. 61 | 52. 95<br>53. 30<br>53. 65 | 52. 99<br>53. 34<br>53. 68 | 53. 02<br>53. 37<br>53. 72 | 53. 06<br>53. 41<br>53. 75 | 53. 09<br>53. 44<br>53. 79 | 53. 13<br>53. 47<br>53. 82 | 53. 16<br>53. 51<br>53. 85 | 1, 310<br>1, 320<br>1, 330                                                                               |
| 1, 340<br>1, 350<br>1, 360                                                                               | 53. 85<br>54. 20<br>54. 54 | 53. 89<br>54. 23<br>54. 57 | 53. 92<br>54. 27<br>54. 61 | 53. 96<br>54. 30<br>54. 64 | 53. 99<br>54. 34<br>54. 68 | 54. 03<br>54. 37<br>54. 71 | 54. 06<br>54. 40<br>54. 74 | 54. 10<br>54. 44<br>54. 78 | 54. 13<br>54. 47<br>54. 81 | 54. 16<br>54. 51<br>54. 85 | 54. 20<br>54. 54<br>54. 88 | 1, 340<br>1, 350<br>1, 360                                                                               |
| 1, 370                                                                                                   | 54. 88                     | 54. 91                     | -----                      | -----                      | -----                      | -----                      | -----                      | -----                      | -----                      | -----                      | -----                      | 1, 370                                                                                                   |
| ° C                                                                                                      | 0                          | 1                          | 2                          | 3                          | 4                          | 5                          | 6                          | 7                          | 8                          | 9                          | 10                         | ° C                                                                                                      |



# Table 7. Iron-Constantan Thermocouples (Modified 1913)

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts | .00  | .10  | .20  | .30  | .40  | .50  | .60  | .70  | .80  | .90   | 1.00  | Millivolts |
|------------|------|------|------|------|------|------|------|------|------|-------|-------|------------|
| Degrees C  |      |      |      |      |      |      |      |      |      |       |       |            |
| − 7.00     | −166 | −169 | −173 | −176 | −180 | −184 | −188 | −192 | −196 | ----- | ----- | − 7.00     |
| − 6.00     | −136 | −138 | −141 | −144 | −147 | −150 | −153 | −156 | −159 | −163  | −166  | − 6.00     |
| − 5.00     | −109 | −112 | −114 | −117 | −119 | −122 | −125 | −127 | −130 | −133  | −136  | − 5.00     |
| − 4.00     | −85  | −87  | −90  | −92  | −94  | −97  | −99  | −102 | −104 | −107  | −109  | − 4.00     |
| − 3.00     | −62  | −65  | −67  | −69  | −71  | −74  | −76  | −78  | −80  | −83   | −85   | − 3.00     |
| − 2.00     | −41  | −43  | −45  | −47  | −49  | −52  | −54  | −56  | −58  | −60   | −62   | − 2.00     |
| − 1.00     | −20  | −22  | −24  | −26  | −28  | −30  | −32  | −35  | −37  | −39   | −41   | − 1.00     |
| (−)0.00    | 0    | −2   | −4   | −6   | −8   | −10  | −12  | −14  | −16  | −18   | −20   | (−)0.00    |
| (+)0.00    | 0    | 2    | 4    | 6    | 8    | 10   | 12   | 14   | 16   | 18    | 20    | (+)0.00    |
| 1.00       | 20   | 22   | 24   | 25   | 27   | 29   | 31   | 33   | 35   | 37    | 39    | 1.00       |
| 2.00       | 39   | 41   | 43   | 45   | 47   | 48   | 50   | 52   | 54   | 56    | 58    | 2.00       |
| 3.00       | 58   | 60   | 62   | 63   | 65   | 67   | 69   | 71   | 73   | 75    | 77    | 3.00       |
| 4.00       | 77   | 78   | 80   | 82   | 84   | 86   | 88   | 90   | 91   | 93    | 95    | 4.00       |
| 5.00       | 95   | 97   | 99   | 101  | 102  | 104  | 106  | 108  | 110  | 112   | 113   | 5.00       |
| 6.00       | 113  | 115  | 117  | 119  | 121  | 123  | 124  | 126  | 128  | 130   | 132   | 6.00       |
| 7.00       | 132  | 134  | 135  | 137  | 139  | 141  | 143  | 144  | 146  | 148   | 150   | 7.00       |
| 8.00       | 150  | 152  | 154  | 155  | 157  | 159  | 161  | 163  | 164  | 166   | 168   | 8.00       |
| 9.00       | 168  | 170  | 172  | 173  | 175  | 177  | 179  | 181  | 182  | 184   | 186   | 9.00       |
| 10.00      | 186  | 188  | 190  | 191  | 193  | 195  | 197  | 199  | 200  | 202   | 204   | 10.00      |
| 11.00      | 204  | 206  | 208  | 209  | 211  | 213  | 215  | 217  | 218  | 220   | 222   | 11.00      |
| 12.00      | 222  | 224  | 226  | 227  | 229  | 231  | 233  | 235  | 236  | 238   | 240   | 12.00      |
| 13.00      | 240  | 242  | 244  | 245  | 247  | 249  | 251  | 253  | 254  | 256   | 258   | 13.00      |
| 14.00      | 258  | 260  | 262  | 263  | 265  | 267  | 269  | 271  | 272  | 274   | 276   | 14.00      |
| 15.00      | 276  | 278  | 280  | 281  | 283  | 285  | 287  | 289  | 290  | 292   | 294   | 15.00      |
| 16.00      | 294  | 296  | 298  | 300  | 301  | 303  | 305  | 307  | 309  | 310   | 312   | 16.00      |
| 17.00      | 312  | 314  | 316  | 318  | 319  | 321  | 323  | 325  | 327  | 329   | 330   | 17.00      |
| 18.00      | 330  | 332  | 334  | 336  | 338  | 339  | 341  | 343  | 345  | 347   | 348   | 18.00      |
| 19.00      | 348  | 350  | 352  | 354  | 356  | 357  | 359  | 361  | 363  | 365   | 366   | 19.00      |
| 20.00      | 366  | 368  | 370  | 372  | 374  | 376  | 377  | 379  | 381  | 383   | 385   | 20.00      |
| 21.00      | 385  | 386  | 388  | 390  | 392  | 394  | 395  | 397  | 399  | 401   | 403   | 21.00      |
| 22.00      | 403  | 405  | 406  | 408  | 410  | 412  | 414  | 416  | 417  | 419   | 421   | 22.00      |
| 23.00      | 421  | 423  | 424  | 426  | 428  | 430  | 432  | 434  | 435  | 437   | 439   | 23.00      |
| 24.00      | 439  | 441  | 443  | 444  | 446  | 448  | 450  | 452  | 453  | 455   | 457   | 24.00      |
| 25.00      | 457  | 459  | 461  | 463  | 464  | 466  | 468  | 470  | 472  | 473   | 475   | 25.00      |
| 26.00      | 475  | 477  | 479  | 481  | 482  | 484  | 486  | 488  | 489  | 491   | 493   | 26.00      |
| 27.00      | 493  | 495  | 497  | 499  | 500  | 502  | 504  | 506  | 507  | 509   | 511   | 27.00      |
| 28.00      | 511  | 513  | 514  | 516  | 518  | 520  | 522  | 523  | 525  | 527   | 529   | 28.00      |
| 29.00      | 529  | 530  | 532  | 534  | 536  | 537  | 539  | 541  | 543  | 544   | 546   | 29.00      |
| 30.00      | 546  | 548  | 550  | 551  | 553  | 555  | 557  | 558  | 560  | 562   | 564   | 30.00      |
| Millivolts | .00  | .10  | .20  | .30  | .40  | .50  | .60  | .70  | .80  | .90   | 1.00  | Millivolts |



# Table 7. Iron-Constantan Thermocouples (Modified 1913)—Continued

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts                                                                             | .00       | .10 | .20 | .30 | .40 | .50 | .60 | .70 | .80 | .90 | 1.00 | Millivolts                                                                             |
|----------------------------------------------------------------------------------------|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|----------------------------------------------------------------------------------------|
| 30.00<br>31.00<br>32.00<br>33.00<br>34.00<br>35.00<br>36.00<br>37.00<br>38.00<br>39.00 | Degrees C |     |     |     |     |     |     |     |     |     |      | 30.00<br>31.00<br>32.00<br>33.00<br>34.00<br>35.00<br>36.00<br>37.00<br>38.00<br>39.00 |
|                                                                                        | 546       | 548 | 550 | 551 | 553 | 555 | 557 | 558 | 560 | 562 | 564  |                                                                                        |
|                                                                                        | 564       | 565 | 567 | 569 | 571 | 572 | 574 | 576 | 577 | 579 | 581  |                                                                                        |
|                                                                                        | 581       | 583 | 584 | 586 | 588 | 589 | 591 | 593 | 595 | 596 | 598  |                                                                                        |
|                                                                                        | 598       | 600 | 601 | 603 | 605 | 607 | 608 | 610 | 612 | 613 | 615  |                                                                                        |
|                                                                                        | 615       | 617 | 618 | 620 | 622 | 624 | 625 | 627 | 629 | 630 | 632  |                                                                                        |
|                                                                                        | 632       | 634 | 635 | 637 | 639 | 640 | 642 | 644 | 645 | 647 | 649  |                                                                                        |
|                                                                                        | 649       | 650 | 652 | 654 | 655 | 657 | 659 | 660 | 662 | 664 | 665  |                                                                                        |
|                                                                                        | 665       | 667 | 668 | 670 | 672 | 673 | 675 | 677 | 678 | 680 | 681  |                                                                                        |
|                                                                                        | 681       | 683 | 685 | 686 | 688 | 690 | 691 | 693 | 694 | 696 | 698  |                                                                                        |
|                                                                                        | 698       | 699 | 701 | 702 | 704 | 706 | 707 | 709 | 710 | 712 | 713  |                                                                                        |
| 40.00                                                                                  | 713       | 715 | 717 | 718 | 720 | 721 | 723 | 725 | 726 | 728 | 729  | 40.00                                                                                  |
| 41.00                                                                                  | 729       | 731 | 732 | 734 | 736 | 737 | 739 | 740 | 742 | 743 | 745  | 41.00                                                                                  |
| 42.00                                                                                  | 745       | 747 | 748 | 750 | 751 | 753 | 754 | 756 | 757 | 759 | 761  | 42.00                                                                                  |
| Millivolts                                                                             | .00       | .10 | .20 | .30 | .40 | .50 | .60 | .70 | .80 | .90 | 1.00 | Millivolts                                                                             |

# Table 8. Iron-Constantan Thermocouples (Modified 1913)

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| °C   | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °C   |
|------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
|      | Millivolts |       |       |       |       |       |       |       |       |       |       |      |
| -190 | -7.66      | -7.69 | -7.71 | -7.73 | -7.76 | -7.78 | -7.56 | -7.59 | -7.61 | -7.64 | -7.66 | -190 |
| -180 | -7.40      | -7.43 | -7.46 | -7.49 | -7.51 | -7.54 | -7.32 | -7.35 | -7.38 | -7.40 | -7.42 | -180 |
| -170 | -7.12      | -7.15 | -7.18 | -7.21 | -7.24 | -7.27 | -7.05 | -7.08 | -7.11 | -7.14 | -7.17 | -170 |
| -160 | -6.82      | -6.85 | -6.88 | -6.91 | -6.94 | -6.97 | -6.75 | -6.78 | -6.81 | -6.84 | -6.87 | -160 |
| -150 | -6.50      | -6.53 | -6.56 | -6.60 | -6.63 | -6.66 | -6.44 | -6.47 | -6.50 | -6.53 | -6.56 | -150 |
| -140 | -6.16      | -6.19 | -6.22 | -6.26 | -6.29 | -6.33 | -6.11 | -6.14 | -6.17 | -6.20 | -6.23 | -140 |
| -130 | -5.80      | -5.84 | -5.87 | -5.91 | -5.94 | -5.98 | -5.76 | -5.79 | -5.82 | -5.85 | -5.88 | -130 |
| -120 | -5.42      | -5.46 | -5.50 | -5.54 | -5.58 | -5.61 | -5.39 | -5.42 | -5.45 | -5.48 | -5.51 | -120 |
| -110 | -5.03      | -5.07 | -5.11 | -5.15 | -5.19 | -5.23 | -5.01 | -5.04 | -5.07 | -5.10 | -5.13 | -110 |
| -100 | -4.63      | -4.67 | -4.71 | -4.75 | -4.79 | -4.83 | -4.61 | -4.64 | -4.67 | -4.70 | -4.73 | -100 |
| -90  | -4.21      | -4.25 | -4.30 | -4.34 | -4.38 | -4.42 | -4.20 | -4.23 | -4.26 | -4.29 | -4.32 | -90  |
| -80  | -3.78      | -3.82 | -3.87 | -3.91 | -3.96 | -4.00 | -3.78 | -3.81 | -3.84 | -3.87 | -3.90 | -80  |
| -70  | -3.34      | -3.38 | -3.43 | -3.47 | -3.52 | -3.56 | -3.34 | -3.37 | -3.40 | -3.43 | -3.46 | -70  |
| -60  | -2.89      | -2.94 | -2.98 | -3.03 | -3.07 | -3.12 | -2.90 | -2.93 | -2.96 | -2.99 | -3.02 | -60  |
| -50  | -2.43      | -2.48 | -2.52 | -2.57 | -2.62 | -2.66 | -2.44 | -2.47 | -2.50 | -2.53 | -2.56 | -50  |
| -40  | -1.96      | -2.01 | -2.06 | -2.10 | -2.15 | -2.20 | -1.98 | -2.01 | -2.04 | -2.07 | -2.10 | -40  |
| -30  | -1.48      | -1.53 | -1.58 | -1.63 | -1.67 | -1.72 | -1.50 | -1.53 | -1.56 | -1.59 | -1.62 | -30  |
| -20  | -1.00      | -1.04 | -1.09 | -1.14 | -1.19 | -1.24 | -1.02 | -1.05 | -1.08 | -1.11 | -1.14 | -20  |
| -10  | -0.50      | -0.55 | -0.60 | -0.65 | -0.70 | -0.75 | -0.52 | -0.55 | -0.58 | -0.61 | -0.64 | -10  |
| (-)0 | 0.00       | -0.05 | -0.10 | -0.15 | -0.20 | -0.25 | -0.30 | -0.35 | -0.40 | -0.45 | -0.50 | (-)0 |
| (+)0 | 0.00       | 0.05  | 0.10  | 0.15  | 0.20  | 0.25  | 0.30  | 0.35  | 0.40  | 0.45  | 0.50  | (+)0 |
| 10   | 0.50       | 0.56  | 0.61  | 0.66  | 0.71  | 0.76  | 0.81  | 0.86  | 0.91  | 0.97  | 1.02  | 10   |
| 20   | 1.02       | 1.07  | 1.12  | 1.17  | 1.22  | 1.28  | 1.33  | 1.38  | 1.43  | 1.48  | 1.54  | 20   |
| 30   | 1.54       | 1.59  | 1.64  | 1.69  | 1.74  | 1.80  | 1.85  | 1.90  | 1.95  | 2.00  | 2.06  | 30   |
| 40   | 2.06       | 2.11  | 2.16  | 2.22  | 2.27  | 2.32  | 2.37  | 2.42  | 2.48  | 2.53  | 2.58  | 40   |
| 50   | 2.58       | 2.64  | 2.69  | 2.74  | 2.80  | 2.85  | 2.90  | 2.96  | 3.01  | 3.06  | 3.11  | 50   |
| 60   | 3.11       | 3.17  | 3.22  | 3.27  | 3.33  | 3.38  | 3.43  | 3.49  | 3.54  | 3.60  | 3.65  | 60   |
| 70   | 3.65       | 3.70  | 3.76  | 3.81  | 3.86  | 3.92  | 3.97  | 4.02  | 4.08  | 4.13  | 4.19  | 70   |
| 80   | 4.19       | 4.24  | 4.29  | 4.35  | 4.40  | 4.46  | 4.51  | 4.56  | 4.62  | 4.67  | 4.73  | 80   |
| 90   | 4.73       | 4.78  | 4.83  | 4.89  | 4.94  | 5.00  | 5.05  | 5.10  | 5.16  | 5.21  | 5.27  | 90   |
| 100  | 5.27       | 5.32  | 5.38  | 5.43  | 5.48  | 5.54  | 5.59  | 5.65  | 5.70  | 5.76  | 5.81  | 100  |
| 110  | 5.81       | 5.86  | 5.92  | 5.97  | 6.03  | 6.08  | 6.14  | 6.19  | 6.25  | 6.30  | 6.36  | 110  |
| 120  | 6.36       | 6.41  | 6.47  | 6.52  | 6.58  | 6.63  | 6.68  | 6.74  | 6.79  | 6.85  | 6.90  | 120  |
| 130  | 6.90       | 6.96  | 7.01  | 7.07  | 7.12  | 7.18  | 7.23  | 7.29  | 7.34  | 7.40  | 7.45  | 130  |
| 140  | 7.45       | 7.51  | 7.56  | 7.62  | 7.67  | 7.73  | 7.78  | 7.84  | 7.89  | 7.95  | 8.00  | 140  |
| 150  | 8.00       | 8.06  | 8.12  | 8.17  | 8.23  | 8.28  | 8.34  | 8.39  | 8.45  | 8.50  | 8.56  | 150  |
| 160  | 8.56       | 8.61  | 8.67  | 8.72  | 8.78  | 8.84  | 8.89  | 8.95  | 9.00  | 9.06  | 9.11  | 160  |
| 170  | 9.11       | 9.17  | 9.22  | 9.28  | 9.33  | 9.39  | 9.44  | 9.50  | 9.56  | 9.61  | 9.67  | 170  |
| 180  | 9.67       | 9.72  | 9.78  | 9.83  | 9.89  | 9.95  | 10.00 | 10.06 | 10.11 | 10.17 | 10.22 | 180  |
| 190  | 10.22      | 10.28 | 10.34 | 10.39 | 10.45 | 10.50 | 10.56 | 10.61 | 10.67 | 10.72 | 10.78 | 190  |
| 200  | 10.78      | 10.84 | 10.89 | 10.95 | 11.00 | 11.06 | 11.12 | 11.17 | 11.23 | 11.28 | 11.34 | 200  |
| °C   | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °C   |

# Table 8. Iron-Constantan Thermocouples (Modified 1913)—Continued

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| °C  | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °C  |
|-----|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|     | Millivolts |       |       |       |       |       |       |       |       |       |       |     |
| 200 | 10.78      | 10.84 | 10.89 | 10.95 | 11.00 | 11.06 | 11.12 | 11.17 | 11.23 | 11.28 | 11.34 | 200 |
| 210 | 11.34      | 11.39 | 11.45 | 11.50 | 11.56 | 11.62 | 11.67 | 11.73 | 11.78 | 11.84 | 11.89 | 210 |
| 220 | 11.89      | 11.95 | 12.00 | 12.06 | 12.12 | 12.17 | 12.23 | 12.28 | 12.34 | 12.39 | 12.45 | 220 |
| 230 | 12.45      | 12.50 | 12.56 | 12.62 | 12.67 | 12.73 | 12.78 | 12.84 | 12.89 | 12.95 | 13.01 | 230 |
| 240 | 13.01      | 13.06 | 13.12 | 13.17 | 13.23 | 13.28 | 13.34 | 13.40 | 13.45 | 13.51 | 13.56 | 240 |
| 250 | 13.56      | 13.62 | 13.67 | 13.73 | 13.78 | 13.84 | 13.89 | 13.95 | 14.00 | 14.06 | 14.12 | 250 |
| 260 | 14.12      | 14.17 | 14.23 | 14.28 | 14.34 | 14.39 | 14.45 | 14.50 | 14.56 | 14.61 | 14.67 | 260 |
| 270 | 14.67      | 14.72 | 14.78 | 14.83 | 14.89 | 14.94 | 15.00 | 15.06 | 15.11 | 15.17 | 15.22 | 270 |
| 280 | 15.22      | 15.28 | 15.33 | 15.39 | 15.44 | 15.50 | 15.55 | 15.61 | 15.66 | 15.72 | 15.77 | 280 |
| 290 | 15.77      | 15.83 | 15.88 | 15.94 | 16.00 | 16.05 | 16.11 | 16.16 | 16.22 | 16.27 | 16.33 | 290 |
| 300 | 16.33      | 16.38 | 16.44 | 16.49 | 16.55 | 16.60 | 16.66 | 16.71 | 16.77 | 16.82 | 16.88 | 300 |
| 310 | 16.88      | 16.93 | 16.99 | 17.04 | 17.10 | 17.15 | 17.21 | 17.26 | 17.32 | 17.37 | 17.43 | 310 |
| 320 | 17.43      | 17.48 | 17.54 | 17.60 | 17.65 | 17.71 | 17.76 | 17.82 | 17.87 | 17.93 | 17.98 | 320 |
| 330 | 17.98      | 18.04 | 18.09 | 18.15 | 18.20 | 18.26 | 18.32 | 18.37 | 18.43 | 18.48 | 18.54 | 330 |
| 340 | 18.54      | 18.59 | 18.65 | 18.70 | 18.76 | 18.81 | 18.87 | 18.92 | 18.98 | 19.03 | 19.09 | 340 |
| 350 | 19.09      | 19.14 | 19.20 | 19.26 | 19.31 | 19.37 | 19.42 | 19.48 | 19.53 | 19.59 | 19.64 | 350 |
| 360 | 19.64      | 19.70 | 19.75 | 19.81 | 19.86 | 19.92 | 19.97 | 20.03 | 20.08 | 20.14 | 20.20 | 360 |
| 370 | 20.20      | 20.25 | 20.31 | 20.36 | 20.42 | 20.47 | 20.53 | 20.58 | 20.64 | 20.69 | 20.75 | 370 |
| 380 | 20.75      | 20.80 | 20.86 | 20.91 | 20.97 | 21.02 | 21.08 | 21.13 | 21.19 | 21.24 | 21.30 | 380 |
| 390 | 21.30      | 21.35 | 21.41 | 21.46 | 21.52 | 21.57 | 21.63 | 21.68 | 21.74 | 21.79 | 21.85 | 390 |
| 400 | 21.85      | 21.90 | 21.96 | 22.02 | 22.07 | 22.13 | 22.18 | 22.24 | 22.29 | 22.35 | 22.40 | 400 |
| 410 | 22.40      | 22.46 | 22.51 | 22.57 | 22.62 | 22.68 | 22.73 | 22.79 | 22.84 | 22.90 | 22.95 | 410 |
| 420 | 22.95      | 23.01 | 23.06 | 23.12 | 23.17 | 23.23 | 23.28 | 23.34 | 23.39 | 23.45 | 23.50 | 420 |
| 430 | 23.50      | 23.56 | 23.61 | 23.67 | 23.72 | 23.78 | 23.83 | 23.89 | 23.94 | 24.00 | 24.06 | 430 |
| 440 | 24.06      | 24.11 | 24.17 | 24.22 | 24.28 | 24.33 | 24.39 | 24.44 | 24.50 | 24.55 | 24.61 | 440 |
| 450 | 24.61      | 24.66 | 24.72 | 24.77 | 24.83 | 24.88 | 24.94 | 25.00 | 25.05 | 25.11 | 25.16 | 450 |
| 460 | 25.16      | 25.22 | 25.27 | 25.33 | 25.38 | 25.44 | 25.49 | 25.55 | 25.60 | 25.66 | 25.72 | 460 |
| 470 | 25.72      | 25.77 | 25.83 | 25.88 | 25.94 | 25.99 | 26.05 | 26.10 | 26.16 | 26.22 | 26.27 | 470 |
| 480 | 26.27      | 26.33 | 26.38 | 26.44 | 26.49 | 26.55 | 26.61 | 26.66 | 26.72 | 26.77 | 26.83 | 480 |
| 490 | 26.83      | 26.89 | 26.94 | 27.00 | 27.05 | 27.11 | 27.17 | 27.22 | 27.28 | 27.33 | 27.39 | 490 |
| 500 | 27.39      | 27.45 | 27.50 | 27.56 | 27.61 | 27.67 | 27.73 | 27.78 | 27.84 | 27.90 | 27.95 | 500 |
| 510 | 27.95      | 28.01 | 28.07 | 28.12 | 28.18 | 28.23 | 28.29 | 28.35 | 28.40 | 28.46 | 28.52 | 510 |
| 520 | 28.52      | 28.57 | 28.63 | 28.69 | 28.74 | 28.80 | 28.86 | 28.91 | 28.97 | 29.02 | 29.08 | 520 |
| 530 | 29.08      | 29.14 | 29.20 | 29.25 | 29.31 | 29.37 | 29.42 | 29.48 | 29.54 | 29.59 | 29.65 | 530 |
| 540 | 29.65      | 29.71 | 29.76 | 29.82 | 29.88 | 29.94 | 29.99 | 30.05 | 30.11 | 30.16 | 30.22 | 540 |
| 550 | 30.22      | 30.28 | 30.34 | 30.39 | 30.45 | 30.51 | 30.57 | 30.62 | 30.68 | 30.74 | 30.80 | 550 |
| 560 | 30.80      | 30.85 | 30.91 | 30.97 | 31.02 | 31.08 | 31.14 | 31.20 | 31.26 | 31.31 | 31.37 | 560 |
| 570 | 31.37      | 31.43 | 31.49 | 31.54 | 31.60 | 31.66 | 31.72 | 31.78 | 31.83 | 31.89 | 31.95 | 570 |
| 580 | 31.95      | 32.01 | 32.06 | 32.12 | 32.18 | 32.24 | 32.30 | 32.36 | 32.41 | 32.47 | 32.53 | 580 |
| 590 | 32.53      | 32.59 | 32.65 | 32.71 | 32.76 | 32.82 | 32.88 | 32.94 | 33.00 | 33.06 | 33.11 | 590 |
| 600 | 33.11      | 33.17 | 33.23 | 33.29 | 33.35 | 33.41 | 33.46 | 33.52 | 33.58 | 33.64 | 33.70 | 600 |
| °C  | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °C  |



**Table 8. Iron-Constantan Thermocouples (Modified 1913)—Continued**  
 (Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1918). Reference Junctions at 0° C.)

| °C  | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °C  |
|-----|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|     | Millivolts |       |       |       |       |       |       |       |       |       |       |     |
| 600 | 33.11      | 33.17 | 33.23 | 33.29 | 33.35 | 33.41 | 33.46 | 33.52 | 33.58 | 33.64 | 33.70 | 600 |
| 610 | 33.70      | 33.76 | 33.82 | 33.88 | 33.94 | 33.99 | 34.05 | 34.11 | 34.17 | 34.23 | 34.29 | 610 |
| 620 | 34.29      | 34.35 | 34.41 | 34.47 | 34.53 | 34.58 | 34.64 | 34.70 | 34.76 | 34.82 | 34.88 | 620 |
| 630 | 34.88      | 34.94 | 35.00 | 35.06 | 35.12 | 35.18 | 35.24 | 35.30 | 35.36 | 35.42 | 35.48 | 630 |
| 640 | 35.48      | 35.54 | 35.60 | 36.66 | 35.72 | 35.78 | 35.84 | 35.90 | 35.96 | 36.02 | 36.08 | 640 |
| 650 | 36.08      | 36.14 | 36.20 | 36.26 | 36.32 | 36.38 | 36.44 | 36.50 | 36.56 | 36.62 | 36.69 | 650 |
| 660 | 36.69      | 36.75 | 36.81 | 36.87 | 36.93 | 36.99 | 37.05 | 37.11 | 37.18 | 37.24 | 37.30 | 660 |
| 670 | 37.30      | 37.36 | 37.42 | 37.48 | 37.54 | 37.60 | 37.66 | 37.73 | 37.79 | 37.85 | 37.91 | 670 |
| 680 | 37.91      | 37.97 | 38.04 | 38.10 | 38.16 | 38.22 | 38.28 | 38.34 | 38.41 | 38.47 | 38.53 | 680 |
| 690 | 38.53      | 38.59 | 38.66 | 38.72 | 38.78 | 38.84 | 38.90 | 38.97 | 39.03 | 39.09 | 39.15 | 690 |
| 700 | 39.15      | 39.22 | 39.28 | 39.34 | 39.40 | 39.47 | 39.53 | 39.59 | 39.65 | 39.72 | 39.78 | 700 |
| 710 | 39.78      | 39.84 | 39.91 | 39.97 | 40.03 | 40.10 | 40.16 | 40.22 | 40.28 | 40.35 | 40.41 | 710 |
| 720 | 40.41      | 40.48 | 40.54 | 40.60 | 40.66 | 40.73 | 40.79 | 40.86 | 40.92 | 40.98 | 41.05 | 720 |
| 730 | 41.05      | 41.11 | 41.17 | 41.24 | 41.30 | 41.36 | 41.43 | 41.49 | 41.56 | 41.62 | 41.68 | 730 |
| 740 | 41.68      | 41.75 | 41.81 | 41.87 | 41.94 | 42.00 | 42.07 | 42.13 | 42.19 | 42.26 | 42.32 | 740 |
| 750 | 42.32      | 42.38 | 42.45 | 42.51 | 42.58 | 42.64 | 42.70 | 42.77 | 42.83 | 42.90 | 42.96 | 750 |
| °C  | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °C  |

# Table 9. Copper-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| Millivolts | 0.00      | 0.10   | 0.20   | 0.30   | 0.40   | 0.50   | 0.60   | 0.70   | 0.80   | 0.90   | 1.00   | Millivolts |
|------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|
|            | Degrees C |        |        |        |        |        |        |        |        |        |        |            |
| -5.00      | -169.1    | -174.3 | -179.7 | -185.4 | -191.3 | -197.1 | -202.9 | -208.7 | -214.5 | -220.3 | -226.1 | -5.00      |
| -4.00      | -124.4    | -128.4 | -132.5 | -136.7 | -141.0 | -145.4 | -149.9 | -154.5 | -159.2 | -164.1 | -169.1 | -4.00      |
| -3.00      | -87.9     | -91.3  | -94.8  | -98.3  | -101.8 | -105.4 | -109.1 | -112.8 | -116.7 | -120.5 | -124.4 | -3.00      |
| -2.00      | -55.9     | -58.9  | -62.0  | -65.1  | -68.3  | -71.4  | -74.6  | -77.9  | -81.2  | -84.5  | -87.9  | -2.00      |
| -1.00      | -26.9     | -29.7  | -32.5  | -35.3  | -38.2  | -41.1  | -44.0  | -46.9  | -49.9  | -52.9  | -55.9  | -1.00      |
| (-)0.00    | 0.0       | -2.6   | -5.2   | -7.9   | -10.5  | -13.2  | -15.9  | -18.6  | -21.3  | -24.1  | -26.9  | (-)0.00    |
| (+)0.00    | 0.0       | 2.6    | 5.2    | 7.7    | 10.3   | 12.8   | 15.3   | 17.8   | 20.3   | 22.8   | 25.3   | (+)0.00    |
| 1.00       | 25.3      | 27.7   | 30.1   | 32.6   | 35.0   | 37.4   | 39.8   | 42.1   | 44.5   | 46.8   | 49.2   | 1.00       |
| 2.00       | 49.2      | 51.5   | 53.8   | 56.2   | 58.5   | 60.8   | 63.0   | 65.3   | 67.6   | 69.8   | 72.1   | 2.00       |
| 3.00       | 72.1      | 74.3   | 76.5   | 78.7   | 81.0   | 83.2   | 85.3   | 87.5   | 89.7   | 91.9   | 94.0   | 3.00       |
| 4.00       | 94.0      | 96.2   | 98.3   | 100.5  | 102.6  | 104.7  | 106.9  | 109.0  | 111.1  | 113.2  | 115.3  | 4.00       |
| 5.00       | 115.3     | 117.4  | 119.4  | 121.5  | 123.6  | 125.6  | 127.7  | 129.8  | 131.8  | 133.8  | 135.9  | 5.00       |
| 6.00       | 135.9     | 137.9  | 139.9  | 141.9  | 143.9  | 145.9  | 147.9  | 149.9  | 151.9  | 153.9  | 155.9  | 6.00       |
| 7.00       | 155.9     | 157.9  | 159.8  | 161.8  | 163.8  | 165.7  | 167.7  | 169.6  | 171.6  | 173.5  | 175.4  | 7.00       |
| 8.00       | 175.4     | 177.4  | 179.3  | 181.2  | 183.1  | 185.1  | 187.0  | 188.9  | 190.8  | 192.7  | 194.6  | 8.00       |
| 9.00       | 194.6     | 196.5  | 198.3  | 200.2  | 202.1  | 204.0  | 205.8  | 207.7  | 209.6  | 211.4  | 213.3  | 9.00       |
| 10.00      | 213.3     | 215.1  | 217.0  | 218.8  | 220.7  | 222.5  | 224.4  | 226.2  | 228.0  | 229.8  | 231.7  | 10.00      |
| 11.00      | 231.7     | 233.5  | 235.3  | 237.1  | 238.9  | 240.7  | 242.6  | 244.4  | 246.2  | 247.9  | 249.7  | 11.00      |
| 12.00      | 249.7     | 251.5  | 253.3  | 255.1  | 256.9  | 258.7  | 260.4  | 262.2  | 264.0  | 265.8  | 267.5  | 12.00      |
| 13.00      | 267.5     | 269.3  | 271.1  | 272.8  | 274.6  | 276.3  | 278.1  | 279.8  | 281.6  | 283.3  | 285.1  | 13.00      |
| 14.00      | 285.1     | 286.8  | 288.5  | 290.3  | 292.0  | 293.7  | 295.5  | 297.2  | 298.9  | 300.6  | 302.3  | 14.00      |
| 15.00      | 302.3     | 304.1  | 305.8  | 307.5  | 309.2  | 310.9  | 312.6  | 314.3  | 316.0  | 317.7  | 319.4  | 15.00      |
| 16.00      | 319.4     | 321.1  | 322.8  | 324.5  | 326.2  | 327.9  | 329.6  | 331.2  | 332.9  | 334.6  | 336.3  | 16.00      |
| 17.00      | 336.3     | 338.0  | 339.6  | 341.3  | 343.0  | 344.7  | 346.3  | 348.0  | 349.7  | 351.3  | 353.0  | 17.00      |
| 18.00      | 353.0     | 354.6  | 356.3  | 357.9  | 359.6  | 361.2  | 362.9  | 364.6  | 366.2  | 367.8  | 369.5  | 18.00      |
| 19.00      | 369.5     | 371.1  | 372.8  | 374.4  | 376.0  | 377.7  | 379.3  | 380.9  | 382.6  | 384.2  | 385.8  | 19.00      |
| 20.00      | 385.8     | 387.5  | 389.1  | 390.7  | 392.3  | 393.9  | 395.6  | 397.2  | 398.8  | -----  | -----  | 20.00      |
| Millivolts | 0.00      | 0.10   | 0.20   | 0.30   | 0.40   | 0.50   | 0.60   | 0.70   | 0.80   | 0.90   | 1.00   | Millivolts |

# Table 10. Copper-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| ° C        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° C  |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Millivolts |        |        |        |        |        |        |        |        |        |        |        |      |
| -190       | -5.379 | -5.395 | -5.411 | -5.427 | -5.443 | -5.459 | -5.475 | -5.491 | -5.507 | -5.523 | -5.539 | -190 |
| -180       | -5.205 | -5.223 | -5.241 | -5.258 | -5.276 | -5.294 | -5.311 | -5.328 | -5.345 | -5.362 | -5.379 | -180 |
| -170       | -5.018 | -5.037 | -5.056 | -5.075 | -5.094 | -5.113 | -5.132 | -5.150 | -5.169 | -5.187 | -5.205 | -170 |
| -160       | -4.817 | -4.838 | -4.858 | -4.878 | -4.899 | -4.919 | -4.939 | -4.959 | -4.978 | -4.998 | -5.018 | -160 |
| -150       | -4.603 | -4.625 | -4.647 | -4.669 | -4.690 | -4.712 | -4.733 | -4.754 | -4.775 | -4.796 | -4.817 | -150 |
| -140       | -4.377 | -4.400 | -4.423 | -4.446 | -4.469 | -4.492 | -4.514 | -4.537 | -4.559 | -4.581 | -4.603 | -140 |
| -130       | -4.138 | -4.162 | -4.187 | -4.211 | -4.235 | -4.259 | -4.283 | -4.307 | -4.330 | -4.354 | -4.377 | -130 |
| -120       | -3.887 | -3.912 | -3.938 | -3.964 | -3.989 | -4.014 | -4.039 | -4.064 | -4.089 | -4.114 | -4.138 | -120 |
| -110       | -3.624 | -3.651 | -3.678 | -3.704 | -3.730 | -3.757 | -3.783 | -3.809 | -3.835 | -3.861 | -3.887 | -110 |
| -100       | -3.349 | -3.377 | -3.405 | -3.432 | -3.460 | -3.488 | -3.515 | -3.542 | -3.570 | -3.597 | -3.624 | -100 |
| -90        | -3.062 | -3.091 | -3.120 | -3.149 | -3.178 | -3.207 | -3.235 | -3.264 | -3.292 | -3.320 | -3.349 | -90  |
| -80        | -2.764 | -2.794 | -2.824 | -2.854 | -2.884 | -2.914 | -2.944 | -2.974 | -3.003 | -3.033 | -3.062 | -80  |
| -70        | -2.455 | -2.486 | -2.518 | -2.549 | -2.580 | -2.611 | -2.642 | -2.672 | -2.703 | -2.733 | -2.764 | -70  |
| -60        | -2.135 | -2.167 | -2.200 | -2.232 | -2.264 | -2.296 | -2.328 | -2.360 | -2.392 | -2.423 | -2.455 | -60  |
| -50        | -1.804 | -1.838 | -1.871 | -1.905 | -1.938 | -1.971 | -2.004 | -2.037 | -2.070 | -2.103 | -2.135 | -50  |
| -40        | -1.463 | -1.498 | -1.532 | -1.567 | -1.601 | -1.635 | -1.669 | -1.703 | -1.737 | -1.771 | -1.804 | -40  |
| -30        | -1.112 | -1.148 | -1.183 | -1.218 | -1.254 | -1.289 | -1.324 | -1.359 | -1.394 | -1.429 | -1.463 | -30  |
| -20        | -0.751 | -0.788 | -0.824 | -0.860 | -0.897 | -0.933 | -0.969 | -1.005 | -1.041 | -1.076 | -1.112 | -20  |
| -10        | -0.380 | -0.417 | -0.455 | -0.492 | -0.530 | -0.567 | -0.604 | -0.641 | -0.678 | -0.714 | -0.751 | -10  |
| (-)0       | 0.000  | -0.038 | -0.077 | -0.115 | -0.153 | -0.191 | -0.229 | -0.267 | -0.305 | -0.343 | -0.380 | (-)0 |
| (+)0       | 0.000  | 0.038  | 0.077  | 0.116  | 0.154  | 0.193  | 0.232  | 0.271  | 0.311  | 0.350  | 0.389  | (+)0 |
| 10         | 0.389  | 0.429  | 0.468  | 0.508  | 0.547  | 0.587  | 0.627  | 0.667  | 0.707  | 0.747  | 0.787  | 10   |
| 20         | 0.787  | 0.827  | 0.868  | 0.908  | 0.949  | 0.990  | 1.030  | 1.071  | 1.112  | 1.153  | 1.194  | 20   |
| 30         | 1.194  | 1.235  | 1.277  | 1.318  | 1.360  | 1.401  | 1.443  | 1.485  | 1.526  | 1.568  | 1.610  | 30   |
| 40         | 1.610  | 1.652  | 1.694  | 1.737  | 1.779  | 1.821  | 1.864  | 1.907  | 1.949  | 1.992  | 2.035  | 40   |
| 50         | 2.035  | 2.078  | 2.121  | 2.164  | 2.207  | 2.250  | 2.293  | 2.336  | 2.380  | 2.423  | 2.467  | 50   |
| 60         | 2.467  | 2.511  | 2.555  | 2.599  | 2.643  | 2.687  | 2.731  | 2.775  | 2.820  | 2.864  | 2.908  | 60   |
| 70         | 2.908  | 2.953  | 2.997  | 3.042  | 3.087  | 3.132  | 3.177  | 3.222  | 3.267  | 3.312  | 3.357  | 70   |
| 80         | 3.357  | 3.402  | 3.448  | 3.493  | 3.539  | 3.584  | 3.630  | 3.676  | 3.722  | 3.767  | 3.813  | 80   |
| 90         | 3.813  | 3.859  | 3.906  | 3.952  | 3.998  | 4.044  | 4.091  | 4.138  | 4.184  | 4.230  | 4.277  | 90   |
| 100        | 4.277  | 4.324  | 4.371  | 4.418  | 4.465  | 4.512  | 4.559  | 4.606  | 4.654  | 4.701  | 4.749  | 100  |
| 110        | 4.749  | 4.796  | 4.843  | 4.891  | 4.939  | 4.987  | 5.035  | 5.083  | 5.131  | 5.179  | 5.227  | 110  |
| 120        | 5.227  | 5.275  | 5.323  | 5.372  | 5.420  | 5.469  | 5.518  | 5.566  | 5.615  | 5.663  | 5.712  | 120  |
| 130        | 5.712  | 5.761  | 5.810  | 5.859  | 5.908  | 5.957  | 6.007  | 6.056  | 6.105  | 6.155  | 6.204  | 130  |
| 140        | 6.204  | 6.254  | 6.303  | 6.353  | 6.403  | 6.453  | 6.503  | 6.553  | 6.603  | 6.653  | 6.703  | 140  |
| 150        | 6.703  | 6.753  | 6.803  | 6.853  | 6.904  | 6.954  | 7.004  | 7.055  | 7.106  | 7.157  | 7.208  | 150  |
| 160        | 7.208  | 7.258  | 7.309  | 7.360  | 7.411  | 7.462  | 7.513  | 7.565  | 7.616  | 7.667  | 7.719  | 160  |
| 170        | 7.719  | 7.770  | 7.822  | 7.874  | 7.926  | 7.978  | 8.029  | 8.080  | 8.132  | 8.184  | 8.236  | 170  |
| 180        | 8.236  | 8.288  | 8.340  | 8.392  | 8.445  | 8.497  | 8.549  | 8.601  | 8.654  | 8.707  | 8.759  | 180  |
| 190        | 8.759  | 8.812  | 8.864  | 8.917  | 8.970  | 9.023  | 9.076  | 9.129  | 9.182  | 9.235  | 9.288  | 190  |
| 200        | 9.288  | 9.341  | 9.394  | 9.448  | 9.501  | 9.555  | 9.608  | 9.662  | 9.715  | 9.769  | 9.823  | 200  |
| ° C        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° C  |



# Table 10. Copper-Constantan Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| ° C                                                                        | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° C                                                                        |
|----------------------------------------------------------------------------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------------------------------------------------------------------------|
| 200<br>210<br>220<br>230<br><br>240<br>250<br>260<br><br>270<br>280<br>290 | Millivolts |        |        |        |        |        |        |        |        |        |        | 200<br>210<br>220<br>230<br><br>240<br>250<br>260<br><br>270<br>280<br>290 |
|                                                                            | 9.288      | 9.341  | 9.394  | 9.448  | 9.501  | 9.555  | 9.608  | 9.662  | 9.715  | 9.769  | 9.823  |                                                                            |
|                                                                            | 9.823      | 9.877  | 9.931  | 9.985  | 10.039 | 10.093 | 10.147 | 10.201 | 10.255 | 10.309 | 10.363 |                                                                            |
|                                                                            | 10.363     | 10.417 | 10.471 | 10.526 | 10.580 | 10.635 | 10.689 | 10.744 | 10.799 | 10.854 | 10.909 |                                                                            |
|                                                                            | 10.909     | 10.963 | 11.018 | 11.073 | 11.128 | 11.183 | 11.238 | 11.293 | 11.348 | 11.403 | 11.459 |                                                                            |
|                                                                            | 11.459     | 11.514 | 11.569 | 11.624 | 11.680 | 11.735 | 11.791 | 11.847 | 11.903 | 11.959 | 12.015 |                                                                            |
|                                                                            | 12.015     | 12.071 | 12.126 | 12.182 | 12.238 | 12.294 | 12.350 | 12.406 | 12.462 | 12.518 | 12.575 |                                                                            |
|                                                                            | 12.575     | 12.631 | 12.688 | 12.744 | 12.800 | 12.857 | 12.913 | 12.970 | 13.027 | 13.083 | 13.140 |                                                                            |
|                                                                            | 13.140     | 13.197 | 13.254 | 13.311 | 13.368 | 13.425 | 13.482 | 13.539 | 13.596 | 13.653 | 13.710 |                                                                            |
|                                                                            | 13.710     | 13.768 | 13.825 | 13.882 | 13.939 | 13.997 | 14.055 | 14.112 | 14.170 | 14.227 | 14.285 |                                                                            |
|                                                                            | 14.285     | 14.343 | 14.400 | 14.458 | 14.515 | 14.573 | 14.631 | 14.689 | 14.747 | 14.805 | 14.864 |                                                                            |
| 300                                                                        | 14.864     | 14.922 | 14.980 | 15.038 | 15.096 | 15.155 | 15.213 | 15.271 | 15.330 | 15.388 | 15.447 | 300                                                                        |
| 310                                                                        | 15.447     | 15.506 | 15.564 | 15.623 | 15.681 | 15.740 | 15.799 | 15.858 | 15.917 | 15.976 | 16.035 | 310                                                                        |
| 320                                                                        | 16.035     | 16.094 | 16.153 | 16.212 | 16.271 | 16.330 | 16.389 | 16.449 | 16.508 | 16.567 | 16.626 | 320                                                                        |
| 330                                                                        | 16.626     | 16.685 | 16.745 | 16.804 | 16.864 | 16.924 | 16.983 | 17.043 | 17.102 | 17.162 | 17.222 | 330                                                                        |
| 340                                                                        | 17.222     | 17.281 | 17.341 | 17.401 | 17.461 | 17.521 | 17.581 | 17.641 | 17.701 | 17.761 | 17.821 | 340                                                                        |
| 350                                                                        | 17.821     | 17.881 | 17.941 | 18.002 | 18.062 | 18.123 | 18.183 | 18.243 | 18.304 | 18.364 | 18.425 | 350                                                                        |
| 360                                                                        | 18.425     | 18.485 | 18.546 | 18.607 | 18.667 | 18.727 | 18.788 | 18.849 | 18.910 | 18.971 | 19.032 | 360                                                                        |
| 370                                                                        | 19.032     | 19.093 | 19.154 | 19.215 | 19.276 | 19.337 | 19.398 | 19.459 | 19.520 | 19.581 | 19.642 | 370                                                                        |
| 380                                                                        | 19.642     | 19.704 | 19.765 | 19.827 | 19.888 | 19.949 | 20.011 | 20.072 | 20.134 | 20.195 | 20.257 | 380                                                                        |
| 390                                                                        | 20.257     | 20.318 | 20.380 | 20.442 | 20.504 | 20.565 | 20.627 | 20.688 | 20.750 | 20.812 | 20.874 | 390                                                                        |
| ° C                                                                        | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° C                                                                        |

# Table 11. Chromel-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

| ° C          | 0          | 10    | 20    | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100   | ° C          |
|--------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------|
|              | Millivolts |       |       |       |       |       |       |       |       |       |       |              |
| <b>-100</b>  | -5.18      | -5.62 | -6.04 | -6.44 | -6.83 | -7.20 | -7.55 | -7.87 | -8.17 | -8.45 | -8.71 | <b>-100</b>  |
| <b>(-) 0</b> | 0.00       | -0.58 | -1.14 | -1.70 | -2.24 | -2.77 | -3.28 | -3.78 | -4.26 | -4.73 | -5.18 | <b>(-) 0</b> |
| <b>(+) 0</b> | 0.00       | 0.59  | 1.19  | 1.80  | 2.41  | 3.04  | 3.68  | 4.33  | 4.99  | 5.65  | 6.32  | <b>(+) 0</b> |
| <b>100</b>   | 6.32       | 7.00  | 7.69  | 8.38  | 9.08  | 9.79  | 10.51 | 11.23 | 11.95 | 12.68 | 13.42 | <b>100</b>   |
| <b>200</b>   | 13.42      | 14.17 | 14.92 | 15.67 | 16.42 | 17.18 | 17.95 | 18.72 | 19.49 | 20.26 | 21.04 | <b>200</b>   |
| <b>300</b>   | 21.04      | 21.82 | 22.60 | 22.39 | 24.18 | 24.97 | 25.76 | 26.56 | 27.35 | 28.15 | 28.95 | <b>300</b>   |
| <b>400</b>   | 28.95      | 29.75 | 30.55 | 31.36 | 32.16 | 32.96 | 33.77 | 34.58 | 35.39 | 36.20 | 37.01 | <b>400</b>   |
| <b>500</b>   | 37.01      | 37.82 | 38.62 | 39.43 | 40.24 | 41.05 | 41.86 | 42.67 | 43.48 | 44.29 | 45.10 | <b>500</b>   |
| <b>600</b>   | 45.10      | 45.91 | 46.72 | 47.53 | 48.33 | 49.13 | 49.93 | 50.73 | 51.54 | 52.34 | 53.14 | <b>600</b>   |
| <b>700</b>   | 53.14      | 53.94 | 54.74 | 55.53 | 56.33 | 57.12 | 57.92 | 58.71 | 59.50 | 60.29 | 61.08 | <b>700</b>   |
| <b>800</b>   | 61.08      | 61.86 | 62.65 | 63.43 | 64.21 | 64.99 | 65.77 | 66.54 | 67.31 | 68.08 | 68.85 | <b>800</b>   |
| <b>900</b>   | 68.85      | 69.62 | 70.39 | 71.15 | 71.92 | 72.68 | 73.44 | 74.20 | 74.95 | 75.70 | 76.45 | <b>900</b>   |
| ° C          | 0          | 10    | 20    | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100   | ° C          |

# Part II. Fahrenheit Tables

## Table 12. Platinum Versus Platinum-10-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .000  | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| Degrees F  |       |       |       |       |       |       |       |       |       |       |       |            |
| 0.000      | 32.0  | 35.3  | 38.6  | 41.8  | 45.0  | 48.2  | 51.4  | 54.5  | 57.7  | 60.8  | 63.9  | 0.000      |
| .100       | 63.9  | 67.0  | 70.0  | 73.1  | 76.1  | 79.1  | 82.1  | 85.1  | 88.0  | 91.0  | 93.9  | .100       |
| .200       | 93.9  | 96.8  | 99.7  | 102.6 | 105.5 | 108.3 | 111.2 | 114.0 | 116.8 | 119.6 | 122.4 | .200       |
| .300       | 122.4 | 125.2 | 128.0 | 130.7 | 133.4 | 136.2 | 138.9 | 141.6 | 144.3 | 147.0 | 149.7 | .300       |
| .400       | 149.7 | 152.3 | 155.0 | 157.6 | 160.3 | 162.9 | 165.5 | 168.1 | 170.7 | 173.3 | 175.9 | .400       |
| .500       | 175.9 | 178.5 | 181.0 | 183.6 | 186.1 | 188.7 | 191.2 | 193.7 | 196.3 | 198.8 | 201.3 | .500       |
| .600       | 201.3 | 203.8 | 206.3 | 208.7 | 211.2 | 213.7 | 216.1 | 218.6 | 221.0 | 223.5 | 225.9 | .600       |
| .700       | 225.9 | 228.3 | 230.7 | 233.2 | 235.6 | 238.0 | 240.4 | 242.7 | 245.1 | 247.5 | 249.9 | .700       |
| .800       | 249.9 | 252.2 | 254.6 | 257.0 | 259.3 | 261.7 | 264.0 | 266.3 | 268.7 | 271.0 | 273.3 | .800       |
| .900       | 273.3 | 275.6 | 277.9 | 280.2 | 282.5 | 284.8 | 287.1 | 289.4 | 291.7 | 294.0 | 296.3 | .900       |
| 1.000      | 296.3 | 298.5 | 300.8 | 303.0 | 305.3 | 307.6 | 309.8 | 312.1 | 314.3 | 316.5 | 318.8 | 1.000      |
| 1.100      | 318.8 | 321.0 | 323.2 | 325.4 | 327.7 | 329.9 | 332.1 | 334.3 | 336.5 | 338.7 | 340.9 | 1.100      |
| 1.200      | 340.9 | 343.1 | 345.3 | 347.5 | 349.7 | 351.9 | 354.0 | 356.2 | 358.4 | 360.6 | 362.7 | 1.200      |
| 1.300      | 362.7 | 364.9 | 367.0 | 369.2 | 371.4 | 373.5 | 375.7 | 377.8 | 380.0 | 382.1 | 384.2 | 1.300      |
| 1.400      | 384.2 | 386.4 | 388.5 | 390.6 | 392.8 | 394.9 | 397.0 | 399.1 | 401.3 | 403.4 | 405.5 | 1.400      |
| 1.500      | 405.5 | 407.6 | 409.7 | 411.8 | 414.0 | 416.1 | 418.2 | 420.3 | 422.4 | 424.5 | 426.6 | 1.500      |
| 1.600      | 426.6 | 428.7 | 430.7 | 432.8 | 434.9 | 437.0 | 439.1 | 441.2 | 443.3 | 445.3 | 447.4 | 1.600      |
| 1.700      | 447.4 | 449.5 | 451.6 | 453.7 | 455.7 | 457.8 | 459.9 | 461.9 | 464.0 | 466.1 | 468.1 | 1.700      |
| 1.800      | 468.1 | 470.2 | 472.2 | 474.3 | 476.3 | 478.4 | 480.4 | 482.5 | 484.5 | 486.6 | 488.6 | 1.800      |
| 1.900      | 488.6 | 490.6 | 492.7 | 494.7 | 496.7 | 498.8 | 500.8 | 502.8 | 504.9 | 506.9 | 508.9 | 1.900      |
| 2.000      | 508.9 | 510.9 | 512.9 | 515.0 | 517.0 | 519.0 | 521.0 | 523.0 | 525.0 | 527.0 | 529.0 | 2.000      |
| 2.100      | 529.0 | 531.0 | 533.0 | 535.0 | 537.0 | 539.0 | 541.0 | 543.0 | 545.0 | 547.0 | 549.0 | 2.100      |
| 2.200      | 549.0 | 551.0 | 553.0 | 555.0 | 557.0 | 558.9 | 560.9 | 562.9 | 564.9 | 566.9 | 568.8 | 2.200      |
| 2.300      | 568.8 | 570.8 | 572.8 | 574.8 | 576.7 | 578.7 | 580.7 | 582.6 | 584.6 | 586.6 | 588.5 | 2.300      |
| 2.400      | 588.5 | 590.5 | 592.5 | 594.4 | 596.4 | 598.3 | 600.3 | 602.3 | 604.2 | 606.2 | 608.1 | 2.400      |
| 2.500      | 608.1 | 610.1 | 612.0 | 614.0 | 615.9 | 617.9 | 619.8 | 621.7 | 623.7 | 625.6 | 627.6 | 2.500      |
| 2.600      | 627.6 | 629.5 | 631.5 | 633.4 | 635.3 | 637.3 | 639.2 | 641.1 | 643.1 | 645.0 | 646.9 | 2.600      |
| 2.700      | 646.9 | 648.9 | 650.8 | 652.7 | 654.6 | 656.6 | 658.5 | 660.4 | 662.3 | 664.3 | 666.2 | 2.700      |
| 2.800      | 666.2 | 668.1 | 670.0 | 671.9 | 673.9 | 675.8 | 677.7 | 679.6 | 681.5 | 683.4 | 685.3 | 2.800      |
| 2.900      | 685.3 | 687.3 | 689.2 | 691.1 | 693.0 | 694.9 | 696.8 | 698.7 | 700.6 | 702.5 | 704.4 | 2.900      |
| 3.000      | 704.4 | 706.3 | 708.2 | 710.1 | 712.0 | 713.9 | 715.8 | 717.7 | 719.6 | 721.5 | 723.4 | 3.000      |
| 3.100      | 723.4 | 725.3 | 727.2 | 729.1 | 731.0 | 732.9 | 734.8 | 736.7 | 738.6 | 740.5 | 742.4 | 3.100      |
| 3.200      | 742.4 | 744.3 | 746.1 | 748.0 | 749.9 | 751.8 | 753.7 | 755.6 | 757.5 | 759.3 | 761.2 | 3.200      |
| 3.300      | 761.2 | 763.1 | 765.0 | 766.9 | 768.8 | 770.6 | 772.5 | 774.4 | 776.3 | 778.2 | 780.0 | 3.300      |
| 3.400      | 780.0 | 781.9 | 783.8 | 785.7 | 787.5 | 789.4 | 791.3 | 793.2 | 795.1 | 796.9 | 798.8 | 3.400      |
| 3.500      | 798.8 | 800.7 | 802.5 | 804.4 | 806.3 | 808.2 | 810.0 | 811.9 | 813.8 | 815.6 | 817.5 | 3.500      |
| 3.600      | 817.5 | 819.3 | 821.2 | 823.1 | 824.9 | 826.8 | 828.7 | 830.5 | 832.4 | 834.2 | 836.1 | 3.600      |
| 3.700      | 836.1 | 838.0 | 839.8 | 841.7 | 843.5 | 845.4 | 847.2 | 849.1 | 851.0 | 852.8 | 854.7 | 3.700      |
| 3.800      | 854.7 | 856.5 | 858.4 | 860.2 | 862.1 | 863.9 | 865.8 | 867.6 | 869.5 | 871.3 | 873.1 | 3.800      |
| 3.900      | 873.1 | 875.0 | 876.8 | 878.7 | 880.5 | 882.4 | 884.2 | 886.1 | 887.9 | 889.7 | 891.6 | 3.900      |
| 4.000      | 891.6 | 893.4 | 895.3 | 897.1 | 898.9 | 900.8 | 902.6 | 904.4 | 906.3 | 908.1 | 909.9 | 4.000      |
| Millivolts | .000  | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts |

\*Based on the International Temperature Scale of 1948.



Table 12. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts                                                                                               | .000      | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts                                                                                               |
|----------------------------------------------------------------------------------------------------------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------------------------------------------------------------------------------------------------------|
| 4. 000<br>4. 100<br>4. 200<br>4. 300<br><br>4. 400<br>4. 500<br>4. 600<br><br>4. 700<br>4. 800<br>4. 900 | Degrees F |         |         |         |         |         |         |         |         |         |         | 4. 000<br>4. 100<br>4. 200<br>4. 300<br><br>4. 400<br>4. 500<br>4. 600<br><br>4. 700<br>4. 800<br>4. 900 |
|                                                                                                          | 891. 6    | 893. 4  | 895. 3  | 897. 1  | 898. 9  | 900. 8  | 902. 6  | 904. 4  | 906. 3  | 908. 1  | 909. 9  |                                                                                                          |
|                                                                                                          | 909. 9    | 911. 8  | 913. 6  | 915. 4  | 917. 3  | 919. 1  | 920. 9  | 922. 8  | 924. 6  | 926. 4  | 928. 2  |                                                                                                          |
|                                                                                                          | 928. 2    | 930. 1  | 931. 9  | 933. 7  | 935. 5  | 937. 4  | 939. 2  | 941. 0  | 942. 8  | 944. 6  | 946. 5  |                                                                                                          |
|                                                                                                          | 946. 5    | 948. 3  | 950. 1  | 951. 9  | 953. 7  | 955. 6  | 957. 4  | 959. 2  | 961. 0  | 962. 8  | 964. 6  |                                                                                                          |
|                                                                                                          | 964. 6    | 966. 5  | 968. 3  | 970. 1  | 971. 9  | 973. 7  | 975. 5  | 977. 3  | 979. 1  | 980. 9  | 982. 7  |                                                                                                          |
|                                                                                                          | 982. 7    | 984. 6  | 986. 4  | 988. 2  | 990. 0  | 991. 8  | 993. 6  | 995. 4  | 997. 2  | 999. 0  | 1000. 8 |                                                                                                          |
|                                                                                                          | 1000. 8   | 1002. 6 | 1004. 4 | 1006. 2 | 1008. 0 | 1009. 8 | 1011. 6 | 1013. 4 | 1015. 2 | 1017. 0 | 1018. 8 |                                                                                                          |
|                                                                                                          | 1018. 8   | 1020. 6 | 1022. 4 | 1024. 2 | 1026. 0 | 1027. 8 | 1029. 5 | 1031. 3 | 1033. 1 | 1034. 9 | 1036. 7 |                                                                                                          |
|                                                                                                          | 1036. 7   | 1038. 5 | 1040. 3 | 1042. 1 | 1043. 9 | 1045. 6 | 1047. 4 | 1049. 2 | 1051. 0 | 1052. 8 | 1054. 6 |                                                                                                          |
|                                                                                                          | 1054. 6   | 1056. 3 | 1058. 1 | 1059. 9 | 1061. 7 | 1063. 5 | 1065. 3 | 1067. 0 | 1068. 8 | 1070. 6 | 1072. 4 |                                                                                                          |
|                                                                                                          | 1072. 4   | 1074. 1 | 1075. 9 | 1077. 7 | 1079. 5 | 1081. 3 | 1083. 1 | 1084. 8 | 1086. 6 | 1088. 3 | 1090. 1 |                                                                                                          |
| 5. 000                                                                                                   | 1072. 4   | 1074. 1 | 1075. 9 | 1077. 7 | 1079. 5 | 1081. 3 | 1083. 1 | 1084. 8 | 1086. 6 | 1088. 3 | 1090. 1 | 5. 000                                                                                                   |
| 5. 100                                                                                                   | 1090. 1   | 1091. 9 | 1093. 7 | 1095. 4 | 1097. 2 | 1099. 0 | 1100. 7 | 1102. 5 | 1104. 3 | 1106. 0 | 1107. 8 | 5. 100                                                                                                   |
| 5. 200                                                                                                   | 1107. 8   | 1109. 6 | 1111. 3 | 1113. 1 | 1114. 9 | 1116. 6 | 1118. 4 | 1120. 1 | 1121. 9 | 1123. 7 | 1125. 4 | 5. 200                                                                                                   |
| 5. 300                                                                                                   | 1125. 4   | 1127. 2 | 1128. 9 | 1130. 7 | 1132. 5 | 1134. 2 | 1136. 0 | 1137. 7 | 1139. 5 | 1141. 2 | 1143. 0 | 5. 300                                                                                                   |
| 5. 400                                                                                                   | 1143. 0   | 1144. 7 | 1146. 5 | 1148. 3 | 1150. 0 | 1151. 8 | 1153. 5 | 1155. 3 | 1157. 0 | 1158. 7 | 1160. 5 | 5. 400                                                                                                   |
| 5. 500                                                                                                   | 1160. 5   | 1162. 2 | 1164. 0 | 1165. 7 | 1167. 5 | 1169. 2 | 1171. 0 | 1172. 7 | 1174. 5 | 1176. 2 | 1177. 9 | 5. 500                                                                                                   |
| 5. 600                                                                                                   | 1177. 9   | 1179. 7 | 1181. 4 | 1183. 2 | 1184. 9 | 1186. 7 | 1188. 4 | 1190. 2 | 1191. 9 | 1193. 6 | 1195. 4 | 5. 600                                                                                                   |
| 5. 700                                                                                                   | 1195. 4   | 1197. 1 | 1198. 9 | 1200. 6 | 1202. 4 | 1204. 1 | 1205. 8 | 1207. 6 | 1209. 3 | 1211. 0 | 1212. 8 | 5. 700                                                                                                   |
| 5. 800                                                                                                   | 1212. 8   | 1214. 5 | 1216. 2 | 1218. 0 | 1219. 7 | 1221. 4 | 1223. 2 | 1224. 9 | 1226. 6 | 1228. 4 | 1230. 1 | 5. 800                                                                                                   |
| 5. 900                                                                                                   | 1230. 1   | 1231. 9 | 1233. 6 | 1235. 3 | 1237. 0 | 1238. 8 | 1240. 5 | 1242. 2 | 1243. 9 | 1245. 7 | 1247. 4 | 5. 900                                                                                                   |
| 6. 000                                                                                                   | 1247. 4   | 1249. 1 | 1250. 8 | 1252. 6 | 1254. 3 | 1256. 0 | 1257. 7 | 1259. 4 | 1261. 2 | 1262. 9 | 1264. 6 | 6. 000                                                                                                   |
| 6. 100                                                                                                   | 1264. 6   | 1266. 3 | 1268. 0 | 1269. 8 | 1271. 5 | 1273. 2 | 1274. 9 | 1276. 6 | 1278. 3 | 1280. 1 | 1281. 8 | 6. 100                                                                                                   |
| 6. 200                                                                                                   | 1281. 8   | 1283. 5 | 1285. 2 | 1286. 9 | 1288. 6 | 1290. 3 | 1292. 0 | 1293. 8 | 1295. 5 | 1297. 2 | 1298. 9 | 6. 200                                                                                                   |
| 6. 300                                                                                                   | 1298. 9   | 1300. 6 | 1302. 3 | 1304. 0 | 1305. 7 | 1307. 4 | 1309. 1 | 1310. 8 | 1312. 5 | 1314. 2 | 1315. 9 | 6. 300                                                                                                   |
| 6. 400                                                                                                   | 1315. 9   | 1317. 6 | 1319. 3 | 1321. 0 | 1322. 7 | 1324. 4 | 1326. 2 | 1327. 9 | 1329. 6 | 1331. 3 | 1333. 0 | 6. 400                                                                                                   |
| 6. 500                                                                                                   | 1333. 0   | 1334. 7 | 1336. 4 | 1338. 0 | 1339. 7 | 1341. 4 | 1343. 1 | 1344. 8 | 1346. 5 | 1348. 2 | 1349. 9 | 6. 500                                                                                                   |
| 6. 600                                                                                                   | 1349. 9   | 1351. 6 | 1353. 3 | 1355. 0 | 1356. 7 | 1358. 4 | 1360. 1 | 1361. 8 | 1363. 4 | 1365. 1 | 1366. 8 | 6. 600                                                                                                   |
| 6. 700                                                                                                   | 1366. 8   | 1368. 5 | 1370. 2 | 1371. 9 | 1373. 6 | 1375. 3 | 1376. 9 | 1378. 6 | 1380. 3 | 1382. 0 | 1383. 7 | 6. 700                                                                                                   |
| 6. 800                                                                                                   | 1383. 7   | 1385. 4 | 1387. 0 | 1388. 7 | 1390. 4 | 1392. 1 | 1393. 8 | 1395. 4 | 1397. 1 | 1398. 8 | 1400. 5 | 6. 800                                                                                                   |
| 6. 900                                                                                                   | 1400. 5   | 1402. 2 | 1403. 8 | 1405. 5 | 1407. 2 | 1408. 9 | 1410. 5 | 1412. 2 | 1413. 9 | 1415. 6 | 1417. 2 | 6. 900                                                                                                   |
| 7. 000                                                                                                   | 1417. 2   | 1418. 9 | 1420. 6 | 1422. 2 | 1423. 9 | 1425. 6 | 1427. 3 | 1428. 9 | 1430. 6 | 1432. 3 | 1433. 9 | 7. 000                                                                                                   |
| 7. 100                                                                                                   | 1433. 9   | 1435. 6 | 1437. 3 | 1438. 9 | 1440. 6 | 1442. 3 | 1443. 9 | 1445. 6 | 1447. 3 | 1448. 9 | 1450. 6 | 7. 100                                                                                                   |
| 7. 200                                                                                                   | 1450. 6   | 1452. 3 | 1453. 9 | 1455. 6 | 1457. 3 | 1458. 9 | 1460. 6 | 1462. 2 | 1463. 9 | 1465. 5 | 1467. 2 | 7. 200                                                                                                   |
| 7. 300                                                                                                   | 1467. 2   | 1468. 9 | 1470. 5 | 1472. 2 | 1473. 8 | 1475. 5 | 1477. 1 | 1478. 8 | 1480. 5 | 1482. 1 | 1483. 8 | 7. 300                                                                                                   |
| 7. 400                                                                                                   | 1483. 8   | 1485. 4 | 1487. 1 | 1488. 7 | 1490. 4 | 1492. 0 | 1493. 7 | 1495. 3 | 1497. 0 | 1498. 6 | 1500. 3 | 7. 400                                                                                                   |
| 7. 500                                                                                                   | 1500. 3   | 1501. 9 | 1503. 6 | 1505. 2 | 1506. 9 | 1508. 5 | 1510. 2 | 1511. 8 | 1513. 5 | 1515. 1 | 1516. 7 | 7. 500                                                                                                   |
| 7. 600                                                                                                   | 1516. 7   | 1518. 4 | 1520. 0 | 1521. 7 | 1523. 3 | 1525. 0 | 1526. 6 | 1528. 2 | 1529. 9 | 1531. 5 | 1533. 2 | 7. 600                                                                                                   |
| 7. 700                                                                                                   | 1533. 2   | 1534. 8 | 1536. 4 | 1538. 1 | 1539. 7 | 1541. 3 | 1543. 0 | 1544. 6 | 1546. 3 | 1547. 9 | 1549. 5 | 7. 700                                                                                                   |
| 7. 800                                                                                                   | 1549. 5   | 1551. 2 | 1552. 8 | 1554. 4 | 1556. 1 | 1557. 7 | 1559. 3 | 1561. 0 | 1562. 6 | 1564. 2 | 1565. 9 | 7. 800                                                                                                   |
| 7. 900                                                                                                   | 1565. 9   | 1567. 5 | 1569. 1 | 1570. 7 | 1572. 4 | 1574. 0 | 1575. 6 | 1577. 3 | 1578. 9 | 1580. 5 | 1582. 1 | 7. 900                                                                                                   |
| 8. 000                                                                                                   | 1582. 1   | 1583. 8 | 1585. 4 | 1587. 0 | 1588. 6 | 1590. 3 | 1591. 9 | 1593. 5 | 1595. 1 | 1596. 7 | 1598. 4 | 8. 000                                                                                                   |
| Millivolts                                                                                               | . 000     | . 010   | . 020   | . 030   | . 040   | . 050   | . 060   | . 070   | . 080   | . 090   | . 100   | Millivolts                                                                                               |

\*Based on the International Temperature Scale of 1948.

# Table 12. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .000   | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|
| Degrees F  |        |        |        |        |        |        |        |        |        |        |        |            |
| 8.000      | 1582.1 | 1583.8 | 1585.4 | 1587.0 | 1588.6 | 1590.3 | 1591.9 | 1593.5 | 1595.1 | 1596.7 | 1598.4 | 8.000      |
| 8.100      | 1598.4 | 1600.0 | 1601.6 | 1603.2 | 1604.8 | 1606.5 | 1608.1 | 1609.7 | 1611.3 | 1612.9 | 1614.6 | 8.100      |
| 8.200      | 1614.6 | 1616.2 | 1617.8 | 1619.4 | 1621.0 | 1622.6 | 1624.2 | 1625.9 | 1627.5 | 1629.1 | 1630.7 | 8.200      |
| 8.300      | 1630.7 | 1632.3 | 1633.9 | 1635.5 | 1637.1 | 1638.8 | 1640.4 | 1642.0 | 1643.6 | 1645.2 | 1646.8 | 8.300      |
| 8.400      | 1646.8 | 1648.4 | 1650.0 | 1651.6 | 1653.2 | 1654.8 | 1656.4 | 1658.0 | 1659.7 | 1661.3 | 1662.9 | 8.400      |
| 8.500      | 1662.9 | 1664.5 | 1666.1 | 1667.7 | 1669.3 | 1670.9 | 1672.5 | 1674.1 | 1675.7 | 1677.3 | 1678.9 | 8.500      |
| 8.600      | 1678.9 | 1680.5 | 1682.1 | 1683.7 | 1685.3 | 1686.9 | 1688.4 | 1690.0 | 1691.6 | 1693.2 | 1694.8 | 8.600      |
| 8.700      | 1694.8 | 1696.4 | 1698.0 | 1699.6 | 1701.2 | 1702.8 | 1704.4 | 1706.0 | 1707.6 | 1709.2 | 1710.8 | 8.700      |
| 8.800      | 1710.8 | 1712.3 | 1713.9 | 1715.5 | 1717.1 | 1718.7 | 1720.3 | 1721.9 | 1723.5 | 1725.1 | 1726.6 | 8.800      |
| 8.900      | 1726.6 | 1728.2 | 1729.8 | 1731.4 | 1733.0 | 1734.6 | 1736.2 | 1737.7 | 1739.3 | 1740.9 | 1742.5 | 8.900      |
| 9.000      | 1742.5 | 1744.1 | 1745.6 | 1747.2 | 1748.8 | 1750.4 | 1752.0 | 1753.5 | 1755.1 | 1756.7 | 1758.3 | 9.000      |
| 9.100      | 1758.3 | 1759.9 | 1761.4 | 1763.0 | 1764.6 | 1766.2 | 1767.7 | 1769.3 | 1770.9 | 1772.5 | 1774.0 | 9.100      |
| 9.200      | 1774.0 | 1775.6 | 1777.2 | 1778.8 | 1780.3 | 1781.9 | 1783.5 | 1785.0 | 1786.6 | 1788.2 | 1789.8 | 9.200      |
| 9.300      | 1789.8 | 1791.3 | 1792.9 | 1794.5 | 1796.0 | 1797.6 | 1799.2 | 1800.7 | 1802.3 | 1803.9 | 1805.4 | 9.300      |
| 9.400      | 1805.4 | 1807.0 | 1808.6 | 1810.1 | 1811.7 | 1813.3 | 1814.8 | 1816.4 | 1817.9 | 1819.5 | 1821.1 | 9.400      |
| 9.500      | 1821.1 | 1822.6 | 1824.2 | 1825.8 | 1827.2 | 1828.9 | 1830.4 | 1832.0 | 1833.5 | 1835.1 | 1836.7 | 9.500      |
| 9.600      | 1836.7 | 1838.2 | 1839.8 | 1841.3 | 1842.9 | 1844.4 | 1846.0 | 1847.6 | 1849.1 | 1850.7 | 1852.2 | 9.600      |
| 9.700      | 1852.2 | 1853.8 | 1855.3 | 1856.9 | 1858.4 | 1860.0 | 1861.5 | 1863.1 | 1864.6 | 1866.2 | 1867.7 | 9.700      |
| 9.800      | 1867.7 | 1869.3 | 1870.8 | 1872.4 | 1873.9 | 1875.5 | 1877.0 | 1878.6 | 1880.1 | 1881.7 | 1883.2 | 9.800      |
| 9.900      | 1883.2 | 1884.8 | 1886.3 | 1887.8 | 1889.4 | 1890.9 | 1892.5 | 1894.0 | 1895.6 | 1897.1 | 1898.7 | 9.900      |
| 10.000     | 1898.7 | 1900.2 | 1901.8 | 1903.3 | 1904.9 | 1906.4 | 1907.9 | 1909.4 | 1911.0 | 1912.5 | 1914.1 | 10.000     |
| 10.100     | 1914.1 | 1915.6 | 1917.2 | 1918.7 | 1920.2 | 1921.7 | 1923.3 | 1924.8 | 1926.4 | 1927.9 | 1929.4 | 10.100     |
| 10.200     | 1929.4 | 1930.9 | 1932.5 | 1934.0 | 1935.6 | 1937.1 | 1938.6 | 1940.1 | 1941.7 | 1943.2 | 1944.8 | 10.200     |
| 10.300     | 1944.8 | 1946.3 | 1947.8 | 1949.4 | 1950.9 | 1952.4 | 1953.9 | 1955.4 | 1957.0 | 1958.5 | 1960.0 | 10.300     |
| 10.400     | 1960.0 | 1961.5 | 1963.1 | 1964.6 | 1966.1 | 1967.7 | 1969.2 | 1970.7 | 1972.2 | 1973.8 | 1975.3 | 10.400     |
| 10.500     | 1975.3 | 1976.8 | 1978.3 | 1979.9 | 1981.4 | 1982.9 | 1984.4 | 1985.9 | 1987.5 | 1989.0 | 1990.5 | 10.500     |
| 10.600     | 1990.5 | 1992.0 | 1993.6 | 1995.1 | 1996.6 | 1998.1 | 1999.6 | 2001.2 | 2002.7 | 2004.2 | 2005.7 | 10.600     |
| 10.700     | 2005.7 | 2007.2 | 2008.8 | 2010.3 | 2011.8 | 2013.3 | 2014.8 | 2016.4 | 2017.9 | 2019.4 | 2020.9 | 10.700     |
| 10.800     | 2020.9 | 2022.4 | 2023.9 | 2025.5 | 2027.0 | 2028.5 | 2030.0 | 2031.5 | 2033.0 | 2034.6 | 2036.1 | 10.800     |
| 10.900     | 2036.1 | 2037.6 | 2039.1 | 2040.6 | 2042.1 | 2043.7 | 2045.2 | 2046.7 | 2048.2 | 2049.7 | 2051.2 | 10.900     |
| 11.000     | 2051.2 | 2052.7 | 2054.2 | 2055.8 | 2057.3 | 2058.8 | 2060.3 | 2061.8 | 2063.3 | 2064.8 | 2066.3 | 11.000     |
| 11.100     | 2066.3 | 2067.9 | 2069.4 | 2070.9 | 2072.4 | 2073.9 | 2075.4 | 2076.9 | 2078.4 | 2079.9 | 2081.4 | 11.100     |
| 11.200     | 2081.4 | 2083.0 | 2084.5 | 2086.0 | 2087.5 | 2089.0 | 2090.5 | 2092.0 | 2093.5 | 2095.0 | 2096.5 | 11.200     |
| 11.300     | 2096.5 | 2098.0 | 2099.5 | 2101.1 | 2102.6 | 2104.1 | 2105.6 | 2107.1 | 2108.6 | 2110.1 | 2111.6 | 11.300     |
| 11.400     | 2111.6 | 2113.1 | 2114.6 | 2116.1 | 2117.6 | 2119.1 | 2120.6 | 2122.1 | 2123.6 | 2125.1 | 2126.6 | 11.400     |
| 11.500     | 2126.6 | 2128.2 | 2129.7 | 2131.2 | 2132.7 | 2134.2 | 2135.7 | 2137.2 | 2138.7 | 2140.2 | 2141.7 | 11.500     |
| 11.600     | 2141.7 | 2143.2 | 2144.7 | 2146.2 | 2147.7 | 2149.2 | 2150.7 | 2152.2 | 2153.7 | 2155.2 | 2156.7 | 11.600     |
| 11.700     | 2156.7 | 2158.2 | 2159.7 | 2161.2 | 2162.7 | 2164.2 | 2165.7 | 2167.2 | 2168.7 | 2170.2 | 2171.7 | 11.700     |
| 11.800     | 2171.7 | 2173.2 | 2174.7 | 2176.2 | 2177.7 | 2179.2 | 2180.7 | 2182.2 | 2183.7 | 2185.2 | 2186.7 | 11.800     |
| 11.900     | 2186.7 | 2188.2 | 2189.7 | 2191.2 | 2192.7 | 2194.2 | 2195.7 | 2197.2 | 2198.7 | 2200.2 | 2201.7 | 11.900     |
| 12.000     | 2201.7 | 2203.2 | 2204.7 | 2206.2 | 2207.7 | 2209.2 | 2210.7 | 2212.2 | 2213.7 | 2215.2 | 2216.7 | 12.000     |
| Millivolts | .000   | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |

\*Based on the International Temperature Scale of 1948.



**Table 12. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------|
| Degrees F  |         |         |         |         |         |         |         |         |         |         |         |            |
| 12. 000    | 2201. 7 | 2203. 2 | 2204. 7 | 2206. 2 | 2207. 7 | 2209. 2 | 2210. 7 | 2212. 2 | 2213. 7 | 2215. 2 | 2216. 7 | 12. 000    |
| 12. 100    | 2216. 7 | 2218. 2 | 2219. 7 | 2221. 2 | 2222. 7 | 2224. 2 | 2225. 7 | 2227. 2 | 2228. 7 | 2230. 2 | 2231. 7 | 12. 100    |
| 12. 200    | 2231. 7 | 2233. 2 | 2234. 7 | 2236. 2 | 2237. 7 | 2239. 2 | 2240. 7 | 2242. 2 | 2243. 6 | 2245. 1 | 2246. 6 | 12. 200    |
| 12. 300    | 2246. 6 | 2248. 1 | 2249. 6 | 2251. 1 | 2252. 6 | 2254. 1 | 2255. 6 | 2257. 1 | 2258. 6 | 2260. 1 | 2261. 6 | 12. 300    |
| 12. 400    | 2261. 6 | 2263. 1 | 2264. 6 | 2266. 1 | 2267. 6 | 2269. 1 | 2270. 6 | 2272. 1 | 2273. 6 | 2275. 1 | 2276. 6 | 12. 400    |
| 12. 500    | 2276. 6 | 2278. 1 | 2279. 5 | 2281. 0 | 2282. 5 | 2284. 0 | 2285. 5 | 2287. 0 | 2288. 5 | 2290. 0 | 2291. 5 | 12. 500    |
| 12. 600    | 2291. 5 | 2293. 0 | 2294. 5 | 2296. 0 | 2297. 5 | 2299. 0 | 2300. 5 | 2302. 0 | 2303. 5 | 2305. 0 | 2306. 5 | 12. 600    |
| 12. 700    | 2306. 5 | 2308. 0 | 2309. 5 | 2311. 0 | 2312. 5 | 2314. 0 | 2315. 4 | 2316. 9 | 2318. 4 | 2319. 9 | 2321. 4 | 12. 700    |
| 12. 800    | 2321. 4 | 2322. 9 | 2324. 4 | 2325. 9 | 2327. 4 | 2328. 9 | 2330. 4 | 2331. 9 | 2333. 4 | 2334. 9 | 2336. 4 | 12. 800    |
| 12. 900    | 2336. 4 | 2337. 9 | 2339. 4 | 2340. 9 | 2342. 4 | 2343. 9 | 2345. 4 | 2346. 9 | 2348. 4 | 2349. 9 | 2351. 4 | 12. 900    |
| 13. 000    | 2351. 4 | 2352. 9 | 2354. 4 | 2355. 9 | 2357. 4 | 2358. 9 | 2360. 4 | 2361. 9 | 2363. 4 | 2364. 9 | 2366. 4 | 13. 000    |
| 13. 100    | 2366. 4 | 2367. 8 | 2369. 3 | 2370. 8 | 2372. 3 | 2373. 8 | 2375. 3 | 2376. 8 | 2378. 3 | 2379. 8 | 2381. 3 | 13. 100    |
| 13. 200    | 2381. 3 | 2382. 8 | 2384. 3 | 2385. 8 | 2387. 3 | 2388. 8 | 2390. 3 | 2391. 8 | 2393. 3 | 2394. 8 | 2396. 3 | 13. 200    |
| 13. 300    | 2396. 3 | 2397. 8 | 2399. 3 | 2400. 8 | 2402. 3 | 2403. 8 | 2405. 3 | 2406. 8 | 2408. 3 | 2409. 8 | 2411. 3 | 13. 300    |
| 13. 400    | 2411. 3 | 2412. 8 | 2414. 3 | 2415. 8 | 2417. 3 | 2418. 8 | 2420. 3 | 2421. 8 | 2423. 3 | 2424. 8 | 2426. 3 | 13. 400    |
| 13. 500    | 2426. 3 | 2427. 8 | 2429. 3 | 2430. 8 | 2432. 3 | 2433. 8 | 2435. 3 | 2436. 8 | 2438. 3 | 2439. 8 | 2441. 3 | 13. 500    |
| 13. 600    | 2441. 3 | 2442. 8 | 2444. 3 | 2445. 8 | 2447. 3 | 2448. 8 | 2450. 3 | 2451. 8 | 2453. 3 | 2454. 8 | 2456. 3 | 13. 600    |
| 13. 700    | 2456. 3 | 2457. 8 | 2459. 3 | 2460. 8 | 2462. 3 | 2463. 8 | 2465. 3 | 2466. 8 | 2468. 3 | 2469. 8 | 2471. 3 | 13. 700    |
| 13. 800    | 2471. 3 | 2472. 8 | 2474. 3 | 2475. 8 | 2477. 3 | 2478. 8 | 2480. 3 | 2481. 8 | 2483. 3 | 2484. 8 | 2486. 3 | 13. 800    |
| 13. 900    | 2486. 3 | 2487. 8 | 2489. 3 | 2490. 8 | 2492. 3 | 2493. 8 | 2495. 3 | 2496. 8 | 2498. 3 | 2499. 8 | 2501. 3 | 13. 900    |
| 14. 000    | 2501. 3 | 2502. 8 | 2504. 3 | 2505. 8 | 2507. 4 | 2508. 9 | 2510. 4 | 2511. 9 | 2513. 4 | 2514. 9 | 2516. 4 | 14. 000    |
| 14. 100    | 2516. 4 | 2517. 9 | 2519. 4 | 2520. 9 | 2522. 4 | 2523. 9 | 2525. 4 | 2526. 9 | 2528. 4 | 2529. 9 | 2531. 4 | 14. 100    |
| 14. 200    | 2531. 4 | 2532. 9 | 2534. 4 | 2535. 9 | 2537. 4 | 2538. 9 | 2540. 4 | 2541. 9 | 2543. 4 | 2544. 9 | 2546. 4 | 14. 200    |
| 14. 300    | 2546. 4 | 2547. 9 | 2549. 4 | 2550. 9 | 2552. 4 | 2554. 0 | 2555. 5 | 2557. 0 | 2558. 5 | 2560. 0 | 2561. 5 | 14. 300    |
| 14. 400    | 2561. 5 | 2563. 0 | 2564. 5 | 2566. 0 | 2567. 5 | 2569. 0 | 2570. 5 | 2572. 0 | 2573. 5 | 2575. 0 | 2576. 5 | 14. 400    |
| 14. 500    | 2576. 5 | 2578. 0 | 2579. 5 | 2581. 0 | 2582. 5 | 2584. 1 | 2585. 6 | 2587. 1 | 2588. 6 | 2590. 1 | 2591. 6 | 14. 500    |
| 14. 600    | 2591. 6 | 2593. 1 | 2594. 6 | 2596. 1 | 2597. 6 | 2599. 1 | 2600. 6 | 2602. 1 | 2603. 6 | 2605. 1 | 2606. 6 | 14. 600    |
| 14. 700    | 2606. 6 | 2608. 1 | 2609. 7 | 2611. 2 | 2612. 7 | 2614. 2 | 2615. 7 | 2617. 2 | 2618. 7 | 2620. 2 | 2621. 7 | 14. 700    |
| 14. 800    | 2621. 7 | 2623. 2 | 2624. 7 | 2626. 2 | 2627. 7 | 2629. 3 | 2630. 8 | 2632. 3 | 2633. 8 | 2635. 3 | 2636. 8 | 14. 800    |
| 14. 900    | 2636. 8 | 2638. 3 | 2639. 8 | 2641. 3 | 2642. 8 | 2644. 3 | 2645. 8 | 2647. 4 | 2648. 9 | 2650. 4 | 2651. 9 | 14. 900    |
| 15. 000    | 2651. 9 | 2653. 4 | 2654. 9 | 2656. 4 | 2657. 9 | 2659. 4 | 2660. 9 | 2662. 4 | 2664. 0 | 2665. 5 | 2667. 0 | 15. 000    |
| 15. 100    | 2667. 0 | 2668. 5 | 2670. 0 | 2671. 5 | 2673. 0 | 2674. 5 | 2676. 0 | 2677. 5 | 2679. 0 | 2680. 6 | 2682. 1 | 15. 100    |
| 15. 200    | 2682. 1 | 2683. 6 | 2685. 1 | 2686. 6 | 2688. 1 | 2689. 6 | 2691. 1 | 2692. 6 | 2694. 2 | 2695. 7 | 2697. 2 | 15. 200    |
| 15. 300    | 2697. 2 | 2698. 7 | 2700. 2 | 2701. 7 | 2703. 2 | 2704. 7 | 2706. 2 | 2707. 8 | 2709. 3 | 2710. 8 | 2712. 3 | 15. 300    |
| 15. 400    | 2712. 3 | 2713. 8 | 2715. 3 | 2716. 8 | 2718. 3 | 2719. 9 | 2721. 4 | 2722. 9 | 2724. 4 | 2725. 9 | 2727. 4 | 15. 400    |
| 15. 500    | 2727. 4 | 2728. 9 | 2730. 4 | 2732. 0 | 2733. 5 | 2735. 0 | 2736. 5 | 2738. 0 | 2739. 5 | 2741. 0 | 2742. 5 | 15. 500    |
| 15. 600    | 2742. 5 | 2744. 1 | 2745. 6 | 2747. 1 | 2748. 6 | 2750. 1 | 2751. 6 | 2753. 1 | 2754. 7 | 2756. 2 | 2757. 7 | 15. 600    |
| 15. 700    | 2757. 7 | 2759. 2 | 2760. 7 | 2762. 2 | 2763. 7 | 2765. 3 | 2766. 8 | 2768. 3 | 2769. 8 | 2771. 3 | 2772. 8 | 15. 700    |
| 15. 800    | 2772. 8 | 2774. 4 | 2775. 9 | 2777. 4 | 2778. 9 | 2780. 4 | 2781. 9 | 2783. 5 | 2785. 0 | 2786. 5 | 2788. 0 | 15. 800    |
| 15. 900    | 2788. 0 | 2789. 5 | 2791. 0 | 2792. 5 | 2794. 1 | 2795. 6 | 2797. 1 | 2798. 6 | 2800. 1 | 2801. 6 | 2803. 2 | 15. 900    |
| 16. 000    | 2803. 2 | 2804. 7 | 2806. 2 | 2807. 7 | 2809. 2 | 2810. 8 | 2812. 3 | 2813. 8 | 2815. 3 | 2816. 8 | 2818. 3 | 16. 000    |
| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |

\*Based on the International Temperature Scale of 1948.



Table 12. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------|
| Degrees F  |         |         |         |         |         |         |         |         |         |         |         |            |
| 16. 000    | 2803. 2 | 2804. 7 | 2806. 2 | 2807. 7 | 2809. 2 | 2810. 8 | 2812. 3 | 2813. 8 | 2815. 3 | 2816. 8 | 2818. 3 | 16. 000    |
| 16. 100    | 2818. 3 | 2819. 9 | 2821. 4 | 2822. 9 | 2824. 4 | 2825. 9 | 2827. 5 | 2829. 0 | 2830. 5 | 2832. 0 | 2833. 5 | 16. 100    |
| 16. 200    | 2833. 5 | 2835. 1 | 2836. 6 | 2838. 1 | 2839. 6 | 2841. 1 | 2842. 6 | 2844. 2 | 2845. 7 | 2847. 2 | 2848. 7 | 16. 200    |
| 16. 300    | 2848. 7 | 2850. 2 | 2851. 8 | 2853. 3 | 2854. 8 | 2856. 3 | 2857. 8 | 2859. 4 | 2860. 9 | 2862. 4 | 2863. 9 | 16. 300    |
| 16. 400    | 2863. 9 | 2865. 5 | 2867. 0 | 2868. 5 | 2870. 0 | 2871. 5 | 2873. 1 | 2874. 6 | 2876. 1 | 2877. 6 | 2879. 2 | 16. 400    |
| 16. 500    | 2879. 2 | 2880. 7 | 2882. 2 | 2883. 7 | 2885. 2 | 2886. 8 | 2888. 3 | 2889. 8 | 2891. 3 | 2892. 9 | 2894. 4 | 16. 500    |
| 16. 600    | 2894. 4 | 2895. 9 | 2897. 4 | 2899. 0 | 2900. 5 | 2902. 0 | 2903. 5 | 2905. 1 | 2906. 6 | 2908. 1 | 2909. 6 | 16. 600    |
| 16. 700    | 2909. 6 | 2911. 2 | 2912. 7 | 2914. 2 | 2915. 7 | 2917. 3 | 2918. 8 | 2920. 3 | 2921. 8 | 2923. 4 | 2924. 9 | 16. 700    |
| 16. 800    | 2924. 9 | 2926. 4 | 2927. 9 | 2929. 5 | 2931. 0 | 2932. 5 | 2934. 0 | 2935. 6 | 2937. 1 | 2938. 6 | 2940. 1 | 16. 800    |
| 16. 900    | 2940. 1 | 2941. 7 | 2943. 2 | 2944. 7 | 2946. 2 | 2947. 8 | 2949. 3 | 2950. 8 | 2952. 4 | 2953. 9 | 2955. 4 | 16. 900    |
| 17. 000    | 2955. 4 | 2956. 9 | 2958. 5 | 2960. 0 | 2961. 5 | 2963. 1 | 2964. 6 | 2966. 1 | 2967. 6 | 2969. 2 | 2970. 7 | 17. 000    |
| 17. 100    | 2970. 7 | 2972. 2 | 2973. 8 | 2975. 3 | 2976. 8 | 2978. 3 | 2979. 9 | 2981. 4 | 2982. 9 | 2984. 5 | 2986. 0 | 17. 100    |
| 17. 200    | 2986. 0 | 2987. 5 | 2989. 1 | 2990. 6 | 2992. 1 | 2993. 6 | 2995. 2 | 2996. 7 | 2998. 2 | 2999. 8 | 3001. 3 | 17. 200    |
| 17. 300    | 3001. 3 | 3002. 8 | 3004. 4 | 3005. 9 | 3007. 4 | 3009. 0 | 3010. 5 | 3012. 0 | 3013. 6 | 3015. 1 | 3016. 6 | 17. 300    |
| 17. 400    | 3016. 6 | 3018. 2 | 3019. 7 | 3021. 2 | 3022. 8 | 3024. 3 | 3025. 8 | 3027. 4 | 3028. 9 | 3030. 4 | 3032. 0 | 17. 400    |
| 17. 500    | 3032. 0 | 3033. 5 | 3035. 0 | 3036. 6 | 3038. 1 | 3039. 6 | 3041. 2 | 3042. 7 | 3044. 2 | 3045. 8 | 3047. 3 | 17. 500    |
| 17. 600    | 3047. 3 | 3048. 8 | 3050. 4 | 3051. 9 | 3053. 4 | 3055. 0 | 3056. 5 | 3058. 1 | 3059. 6 | 3061. 1 | 3062. 7 | 17. 600    |
| 17. 700    | 3062. 7 | 3064. 2 | 3065. 7 | 3067. 3 | 3068. 8 | 3070. 3 | 3071. 9 | 3073. 4 | 3075. 0 | 3076. 5 | 3078. 0 | 17. 700    |
| 17. 800    | 3078. 0 | 3079. 6 | 3081. 1 | 3082. 6 | 3084. 2 | 3085. 7 | 3087. 3 | 3088. 8 | 3090. 3 | 3091. 9 | 3093. 4 | 17. 800    |
| 17. 900    | 3093. 4 | 3095. 0 | 3096. 5 | 3098. 0 | 3099. 6 | 3101. 1 | 3102. 7 | 3104. 2 | 3105. 7 | 3107. 3 | 3108. 8 | 17. 900    |
| 18. 000    | 3108. 8 | 3110. 4 | 3111. 9 | 3113. 4 | 3115. 0 | 3116. 5 | 3118. 1 | 3119. 6 | 3121. 1 | 3122. 7 | 3124. 2 | 18. 000    |
| 18. 100    | 3124. 2 | 3125. 8 | 3127. 3 | 3128. 9 | 3130. 4 | 3131. 9 | 3133. 5 | 3135. 0 | 3136. 6 | 3138. 1 | 3139. 7 | 18. 100    |
| 18. 200    | 3139. 7 | 3141. 2 | 3142. 7 | 3144. 3 | 3145. 8 | 3147. 4 | 3148. 9 | 3150. 5 | 3152. 0 | 3153. 6 | 3155. 1 | 18. 200    |
| 18. 300    | 3155. 1 | 3156. 6 | 3158. 2 | 3159. 7 | 3161. 3 | 3162. 8 | 3164. 4 | 3165. 9 | 3167. 5 | 3169. 0 | 3170. 6 | 18. 300    |
| 18. 400    | 3170. 6 | 3172. 1 | 3173. 7 | 3175. 2 | 3176. 7 | 3178. 3 | 3179. 8 | 3181. 4 | 3182. 9 | 3184. 5 | 3186. 0 | 18. 400    |
| 18. 500    | 3186. 0 | 3187. 6 | 3189. 1 | 3190. 7 | 3192. 2 | 3193. 8 | 3195. 3 | 3196. 9 | 3198. 4 | 3200. 0 | 3201. 5 | 18. 500    |
| 18. 600    | 3201. 5 | 3203. 1 | 3204. 6 | 3206. 2 | 3207. 7 | 3209. 3 | 3210. 8 | 3212. 4 | 3213. 9 | 3215. 5 | -----   | 18. 600    |
| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |

\* Based on the International Temperature Scale of 1948.

**Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples**  
 (Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F                                        | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F                                        |
|--------------------------------------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------------------------------|
| 30<br>40<br>50<br>60<br><br>70<br>80<br>90 | Millivolts |       |       |       |       |       |       |       |       |       |       | 30<br>40<br>50<br>60<br><br>70<br>80<br>90 |
|                                            | -----      | ----- | 0.000 | 0.003 | 0.006 | 0.009 | 0.012 | 0.015 | 0.018 | 0.021 | 0.024 |                                            |
|                                            | 0.024      | 0.028 | .031  | .034  | .037  | .040  | .043  | .046  | .049  | .052  | .056  |                                            |
|                                            | .056       | .059  | .062  | .065  | .068  | .071  | .075  | .078  | .081  | .084  | .087  |                                            |
|                                            | .087       | .091  | .094  | .097  | .100  | .104  | .107  | .110  | .113  | .117  | .120  |                                            |
|                                            | .120       | .123  | .126  | .130  | .133  | .136  | .140  | .143  | .146  | .150  | .153  |                                            |
|                                            | .153       | .156  | .160  | .163  | .166  | .170  | .173  | .176  | .180  | .183  | .187  |                                            |
|                                            | .187       | .190  | .193  | .197  | .200  | .204  | .207  | .211  | .214  | .218  | .221  |                                            |
|                                            | .221       | .224  | .228  | .231  | .235  | .238  | .242  | .245  | .249  | .252  | .256  |                                            |
|                                            | .256       | .259  | .263  | .266  | .270  | .274  | .277  | .281  | .284  | .288  | .291  |                                            |
| 100                                        | .291       | .295  | .299  | .302  | .306  | .309  | .313  | .317  | .320  | .324  | .327  | 100                                        |
| 110                                        | .327       | .331  | .335  | .338  | .342  | .346  | .349  | .353  | .357  | .360  | .364  | 110                                        |
| 120                                        | .364       | .368  | .371  | .375  | .379  | .383  | .386  | .390  | .394  | .397  | .401  | 120                                        |
| 130                                        | .401       | .405  | .409  | .412  | .416  | .420  | .424  | .428  | .431  | .435  | .439  | 130                                        |
| 140                                        | .439       | .443  | .447  | .450  | .454  | .458  | .462  | .466  | .469  | .473  | .477  | 140                                        |
| 150                                        | .477       | .481  | .485  | .489  | .493  | .496  | .500  | .504  | .508  | .512  | .516  | 150                                        |
| 160                                        | .516       | .520  | .524  | .528  | .532  | .535  | .539  | .543  | .547  | .551  | .555  | 160                                        |
| 170                                        | .555       | .559  | .563  | .567  | .571  | .575  | .579  | .583  | .587  | .591  | .595  | 170                                        |
| 180                                        | .595       | .599  | .603  | .607  | .611  | .615  | .619  | .623  | .627  | .631  | .635  | 180                                        |
| 190                                        | .635       | .639  | .643  | .647  | .651  | .655  | .659  | .664  | .668  | .672  | .676  | 190                                        |
| 200                                        | .676       | .680  | .684  | .688  | .692  | .696  | .700  | .705  | .709  | .713  | .717  | 200                                        |
| 210                                        | .717       | .721  | .725  | .729  | .734  | .738  | .742  | .746  | .750  | .754  | .758  | 210                                        |
| 220                                        | .758       | .763  | .767  | .771  | .775  | .779  | .784  | .788  | .792  | .796  | .800  | 220                                        |
| 230                                        | .800       | .805  | .809  | .813  | .817  | .822  | .826  | .830  | .834  | .839  | .843  | 230                                        |
| 240                                        | .843       | .847  | .851  | .856  | .860  | .864  | .869  | .873  | .877  | .881  | .886  | 240                                        |
| 250                                        | .886       | .890  | .894  | .899  | .903  | .907  | .912  | .916  | .920  | .925  | .929  | 250                                        |
| 260                                        | .929       | .933  | .938  | .942  | .946  | .951  | .955  | .959  | .964  | .968  | .973  | 260                                        |
| 270                                        | .973       | .977  | .981  | .986  | .990  | .994  | .999  | 1.003 | 1.008 | 1.012 | 1.017 | 270                                        |
| 280                                        | 1.017      | 1.021 | 1.025 | 1.030 | 1.034 | 1.039 | 1.043 | 1.048 | 1.052 | 1.056 | 1.061 | 280                                        |
| 290                                        | 1.061      | 1.065 | 1.070 | 1.074 | 1.079 | 1.083 | 1.088 | 1.092 | 1.097 | 1.101 | 1.106 | 290                                        |
| 300                                        | 1.106      | 1.110 | 1.115 | 1.119 | 1.124 | 1.128 | 1.132 | 1.137 | 1.142 | 1.146 | 1.151 | 300                                        |
| 310                                        | 1.151      | 1.155 | 1.160 | 1.164 | 1.169 | 1.173 | 1.178 | 1.182 | 1.187 | 1.191 | 1.196 | 310                                        |
| 320                                        | 1.196      | 1.200 | 1.205 | 1.210 | 1.214 | 1.219 | 1.223 | 1.228 | 1.232 | 1.237 | 1.242 | 320                                        |
| 330                                        | 1.242      | 1.246 | 1.251 | 1.255 | 1.260 | 1.264 | 1.269 | 1.274 | 1.278 | 1.283 | 1.287 | 330                                        |
| 340                                        | 1.287      | 1.292 | 1.297 | 1.301 | 1.306 | 1.311 | 1.315 | 1.320 | 1.324 | 1.329 | 1.334 | 340                                        |
| 350                                        | 1.334      | 1.338 | 1.343 | 1.348 | 1.352 | 1.357 | 1.362 | 1.366 | 1.371 | 1.376 | 1.380 | 350                                        |
| 360                                        | 1.380      | 1.385 | 1.390 | 1.394 | 1.399 | 1.404 | 1.408 | 1.413 | 1.418 | 1.422 | 1.427 | 360                                        |
| 370                                        | 1.427      | 1.432 | 1.436 | 1.441 | 1.446 | 1.450 | 1.455 | 1.460 | 1.465 | 1.469 | 1.474 | 370                                        |
| 380                                        | 1.474      | 1.479 | 1.483 | 1.488 | 1.493 | 1.498 | 1.502 | 1.507 | 1.512 | 1.516 | 1.521 | 380                                        |
| 390                                        | 1.521      | 1.525 | 1.529 | 1.534 | 1.538 | 1.543 | 1.547 | 1.552 | 1.556 | 1.561 | 1.565 | 390                                        |
| 400                                        | 1.565      | 1.569 | 1.574 | 1.578 | 1.583 | 1.587 | 1.592 | 1.596 | 1.601 | 1.605 | 1.610 | 400                                        |
| ° F                                        | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F                                        |

\*Based on the International Temperature Scale of 1948.



Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F        | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| Millivolts |       |       |       |       |       |       |       |       |       |       |       |     |
| 400        | 1.474 | 1.479 | 1.483 | 1.488 | 1.493 | 1.498 | 1.502 | 1.507 | 1.512 | 1.516 | 1.521 |     |
| 410        | 1.521 | 1.526 | 1.531 | 1.535 | 1.540 | 1.545 | 1.550 | 1.554 | 1.559 | 1.564 | 1.569 |     |
| 420        | 1.569 | 1.573 | 1.578 | 1.583 | 1.588 | 1.593 | 1.597 | 1.602 | 1.607 | 1.612 | 1.616 |     |
| 430        | 1.616 | 1.621 | 1.626 | 1.631 | 1.636 | 1.640 | 1.645 | 1.650 | 1.655 | 1.660 | 1.664 |     |
| 440        | 1.664 | 1.669 | 1.674 | 1.679 | 1.684 | 1.688 | 1.693 | 1.698 | 1.703 | 1.708 | 1.712 |     |
| 450        | 1.712 | 1.717 | 1.722 | 1.727 | 1.732 | 1.736 | 1.741 | 1.746 | 1.751 | 1.756 | 1.761 |     |
| 460        | 1.761 | 1.765 | 1.770 | 1.775 | 1.780 | 1.785 | 1.790 | 1.795 | 1.799 | 1.804 | 1.809 |     |
| 470        | 1.809 | 1.814 | 1.819 | 1.824 | 1.829 | 1.833 | 1.838 | 1.843 | 1.848 | 1.853 | 1.858 |     |
| 480        | 1.858 | 1.863 | 1.868 | 1.873 | 1.877 | 1.882 | 1.887 | 1.892 | 1.897 | 1.902 | 1.907 |     |
| 490        | 1.907 | 1.912 | 1.917 | 1.922 | 1.927 | 1.931 | 1.936 | 1.941 | 1.946 | 1.951 | 1.956 |     |
| 500        | 1.956 | 1.961 | 1.966 | 1.971 | 1.976 | 1.981 | 1.986 | 1.991 | 1.996 | 2.000 | 2.005 | 500 |
| 510        | 2.005 | 2.010 | 2.015 | 2.020 | 2.025 | 2.030 | 2.035 | 2.040 | 2.045 | 2.050 | 2.055 | 510 |
| 520        | 2.055 | 2.060 | 2.065 | 2.070 | 2.075 | 2.080 | 2.085 | 2.090 | 2.095 | 2.100 | 2.105 | 520 |
| 530        | 2.105 | 2.110 | 2.115 | 2.120 | 2.125 | 2.130 | 2.135 | 2.140 | 2.145 | 2.150 | 2.155 | 530 |
| 540        | 2.155 | 2.160 | 2.165 | 2.170 | 2.175 | 2.180 | 2.185 | 2.190 | 2.195 | 2.200 | 2.205 | 540 |
| 550        | 2.205 | 2.210 | 2.215 | 2.220 | 2.225 | 2.230 | 2.235 | 2.240 | 2.245 | 2.250 | 2.255 | 550 |
| 560        | 2.255 | 2.260 | 2.265 | 2.270 | 2.276 | 2.281 | 2.286 | 2.291 | 2.296 | 2.301 | 2.306 | 560 |
| 570        | 2.306 | 2.311 | 2.316 | 2.321 | 2.326 | 2.331 | 2.336 | 2.341 | 2.346 | 2.351 | 2.357 | 570 |
| 580        | 2.357 | 2.362 | 2.367 | 2.372 | 2.377 | 2.382 | 2.387 | 2.392 | 2.397 | 2.402 | 2.407 | 580 |
| 590        | 2.407 | 2.413 | 2.418 | 2.423 | 2.428 | 2.433 | 2.438 | 2.443 | 2.448 | 2.453 | 2.458 | 590 |
| 600        | 2.458 | 2.464 | 2.469 | 2.474 | 2.479 | 2.484 | 2.489 | 2.494 | 2.499 | 2.505 | 2.510 | 600 |
| 610        | 2.510 | 2.515 | 2.520 | 2.525 | 2.530 | 2.535 | 2.540 | 2.546 | 2.551 | 2.556 | 2.561 | 610 |
| 620        | 2.561 | 2.566 | 2.571 | 2.576 | 2.582 | 2.587 | 2.592 | 2.597 | 2.602 | 2.607 | 2.613 | 620 |
| 630        | 2.613 | 2.618 | 2.623 | 2.628 | 2.633 | 2.638 | 2.644 | 2.649 | 2.654 | 2.659 | 2.664 | 630 |
| 640        | 2.664 | 2.669 | 2.675 | 2.680 | 2.685 | 2.690 | 2.695 | 2.700 | 2.706 | 2.711 | 2.716 | 640 |
| 650        | 2.716 | 2.721 | 2.726 | 2.731 | 2.737 | 2.742 | 2.747 | 2.752 | 2.757 | 2.763 | 2.768 | 650 |
| 660        | 2.768 | 2.773 | 2.778 | 2.783 | 2.789 | 2.794 | 2.799 | 2.804 | 2.809 | 2.815 | 2.820 | 660 |
| 670        | 2.820 | 2.825 | 2.830 | 2.836 | 2.841 | 2.846 | 2.851 | 2.856 | 2.862 | 2.867 | 2.872 | 670 |
| 680        | 2.872 | 2.877 | 2.882 | 2.888 | 2.893 | 2.898 | 2.903 | 2.909 | 2.914 | 2.919 | 2.924 | 680 |
| 690        | 2.924 | 2.930 | 2.935 | 2.940 | 2.945 | 2.951 | 2.956 | 2.961 | 2.966 | 2.972 | 2.977 | 690 |
| 700        | 2.977 | 2.982 | 2.987 | 2.992 | 2.998 | 3.003 | 3.008 | 3.014 | 3.019 | 3.024 | 3.029 | 700 |
| 710        | 3.029 | 3.035 | 3.040 | 3.045 | 3.050 | 3.056 | 3.061 | 3.066 | 3.071 | 3.077 | 3.082 | 710 |
| 720        | 3.082 | 3.087 | 3.092 | 3.098 | 3.102 | 3.108 | 3.114 | 3.119 | 3.124 | 3.129 | 3.135 | 720 |
| 730        | 3.135 | 3.140 | 3.145 | 3.150 | 3.156 | 3.161 | 3.166 | 3.172 | 3.177 | 3.182 | 3.188 | 730 |
| 740        | 3.188 | 3.193 | 3.198 | 3.203 | 3.209 | 3.214 | 3.219 | 3.225 | 3.230 | 3.235 | 3.240 | 740 |
| 750        | 3.240 | 3.246 | 3.251 | 3.256 | 3.262 | 3.267 | 3.272 | 3.278 | 3.283 | 3.288 | 3.293 | 750 |
| 760        | 3.293 | 3.299 | 3.304 | 3.309 | 3.315 | 3.320 | 3.325 | 3.331 | 3.336 | 3.341 | 3.347 | 760 |
| 770        | 3.347 | 3.352 | 3.357 | 3.363 | 3.368 | 3.373 | 3.378 | 3.384 | 3.389 | 3.394 | 3.400 | 770 |
| 780        | 3.400 | 3.405 | 3.410 | 3.416 | 3.421 | 3.426 | 3.432 | 3.437 | 3.442 | 3.448 | 3.453 | 780 |
| 790        | 3.453 | 3.458 | 3.464 | 3.469 | 3.474 | 3.480 | 3.485 | 3.490 | 3.496 | 3.501 | 3.506 | 790 |
| 800        | 3.506 | 3.512 | 3.517 | 3.522 | 3.528 | 3.533 | 3.539 | 3.544 | 3.549 | 3.555 | 3.560 | 800 |
| ° F        | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F |

\*Based on the International Temperature Scale of 1948.



Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F    | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F    |
|--------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 800    | Millivolts |        |        |        |        |        |        |        |        |        |        | 800    |
|        | 3. 506     | 3. 512 | 3. 517 | 3. 522 | 3. 528 | 3. 533 | 3. 539 | 3. 544 | 3. 549 | 3. 555 | 3. 560 |        |
|        | 3. 560     | 3. 565 | 3. 571 | 3. 576 | 3. 581 | 3. 587 | 3. 592 | 3. 597 | 3. 603 | 3. 608 | 3. 614 |        |
|        | 3. 614     | 3. 619 | 3. 624 | 3. 630 | 3. 635 | 3. 640 | 3. 646 | 3. 651 | 3. 656 | 3. 662 | 3. 667 |        |
|        | 3. 667     | 3. 673 | 3. 678 | 3. 683 | 3. 689 | 3. 694 | 3. 699 | 3. 705 | 3. 710 | 3. 716 | 3. 721 |        |
|        | 3. 721     | 3. 726 | 3. 732 | 3. 737 | 3. 743 | 3. 748 | 3. 753 | 3. 759 | 3. 764 | 3. 769 | 3. 775 |        |
|        | 3. 775     | 3. 780 | 3. 786 | 3. 791 | 3. 796 | 3. 802 | 3. 807 | 3. 813 | 3. 818 | 3. 823 | 3. 829 |        |
|        | 3. 829     | 3. 834 | 3. 840 | 3. 845 | 3. 850 | 3. 856 | 3. 861 | 3. 867 | 3. 872 | 3. 878 | 3. 883 |        |
|        | 3. 883     | 3. 888 | 3. 894 | 3. 899 | 3. 905 | 3. 910 | 3. 915 | 3. 921 | 3. 926 | 3. 932 | 3. 937 |        |
|        | 3. 937     | 3. 943 | 3. 948 | 3. 953 | 3. 959 | 3. 964 | 3. 970 | 3. 975 | 3. 981 | 3. 986 | 3. 991 |        |
| 900    | 4. 046     | 4. 051 | 4. 057 | 4. 062 | 4. 068 | 4. 073 | 4. 079 | 4. 084 | 4. 089 | 4. 095 | 4. 100 | 900    |
| 910    | 4. 100     | 4. 106 | 4. 111 | 4. 117 | 4. 122 | 4. 128 | 4. 133 | 4. 139 | 4. 144 | 4. 149 | 4. 155 | 910    |
| 920    | 4. 155     | 4. 160 | 4. 166 | 4. 171 | 4. 177 | 4. 182 | 4. 188 | 4. 193 | 4. 199 | 4. 204 | 4. 210 | 920    |
| 930    | 4. 210     | 4. 215 | 4. 221 | 4. 226 | 4. 232 | 4. 237 | 4. 243 | 4. 248 | 4. 254 | 4. 259 | 4. 264 | 930    |
| 940    | 4. 264     | 4. 270 | 4. 275 | 4. 281 | 4. 286 | 4. 292 | 4. 297 | 4. 303 | 4. 308 | 4. 314 | 4. 319 | 940    |
| 950    | 4. 319     | 4. 325 | 4. 330 | 4. 336 | 4. 341 | 4. 347 | 4. 352 | 4. 358 | 4. 363 | 4. 369 | 4. 374 | 950    |
| 960    | 4. 374     | 4. 380 | 4. 385 | 4. 391 | 4. 396 | 4. 402 | 4. 408 | 4. 413 | 4. 419 | 4. 424 | 4. 430 | 960    |
| 970    | 4. 430     | 4. 435 | 4. 441 | 4. 446 | 4. 452 | 4. 457 | 4. 463 | 4. 468 | 4. 474 | 4. 479 | 4. 485 | 970    |
| 980    | 4. 485     | 4. 490 | 4. 496 | 4. 501 | 4. 507 | 4. 512 | 4. 518 | 4. 524 | 4. 529 | 4. 535 | 4. 540 | 980    |
| 990    | 4. 540     | 4. 546 | 4. 551 | 4. 557 | 4. 562 | 4. 568 | 4. 573 | 4. 579 | 4. 584 | 4. 590 | 4. 596 | 990    |
| 1, 000 | 4. 596     | 4. 601 | 4. 607 | 4. 612 | 4. 618 | 4. 623 | 4. 629 | 4. 634 | 4. 640 | 4. 646 | 4. 651 | 1, 000 |
| 1, 010 | 4. 651     | 4. 657 | 4. 662 | 4. 668 | 4. 673 | 4. 679 | 4. 685 | 4. 690 | 4. 696 | 4. 701 | 4. 707 | 1, 010 |
| 1, 020 | 4. 707     | 4. 712 | 4. 718 | 4. 724 | 4. 729 | 4. 735 | 4. 740 | 4. 746 | 4. 751 | 4. 757 | 4. 763 | 1, 020 |
| 1, 030 | 4. 763     | 4. 768 | 4. 774 | 4. 779 | 4. 785 | 4. 790 | 4. 796 | 4. 802 | 4. 807 | 4. 813 | 4. 818 | 1, 030 |
| 1, 040 | 4. 818     | 4. 824 | 4. 830 | 4. 835 | 4. 841 | 4. 846 | 4. 852 | 4. 858 | 4. 863 | 4. 869 | 4. 874 | 1, 040 |
| 1, 050 | 4. 874     | 4. 880 | 4. 886 | 4. 891 | 4. 897 | 4. 902 | 4. 908 | 4. 914 | 4. 919 | 4. 925 | 4. 930 | 1, 050 |
| 1, 060 | 4. 930     | 4. 936 | 4. 942 | 4. 947 | 4. 953 | 4. 959 | 4. 964 | 4. 970 | 4. 975 | 4. 981 | 4. 987 | 1, 060 |
| 1, 070 | 4. 987     | 4. 992 | 4. 998 | 5. 004 | 5. 009 | 5. 015 | 5. 020 | 5. 026 | 5. 032 | 5. 037 | 5. 043 | 1, 070 |
| 1, 080 | 5. 043     | 5. 049 | 5. 054 | 5. 060 | 5. 066 | 5. 071 | 5. 077 | 5. 082 | 5. 088 | 5. 094 | 5. 099 | 1, 080 |
| 1, 090 | 5. 099     | 5. 105 | 5. 111 | 5. 116 | 5. 122 | 5. 128 | 5. 133 | 5. 139 | 5. 145 | 5. 150 | 5. 156 | 1, 090 |
| 1, 100 | 5. 156     | 5. 162 | 5. 167 | 5. 173 | 5. 178 | 5. 184 | 5. 190 | 5. 195 | 5. 201 | 5. 207 | 5. 212 | 1, 100 |
| 1, 110 | 5. 212     | 5. 218 | 5. 224 | 5. 229 | 5. 235 | 5. 241 | 5. 246 | 5. 252 | 5. 258 | 5. 264 | 5. 269 | 1, 110 |
| 1, 120 | 5. 269     | 5. 275 | 5. 281 | 5. 286 | 5. 292 | 5. 298 | 5. 303 | 5. 309 | 5. 315 | 5. 320 | 5. 326 | 1, 120 |
| 1, 130 | 5. 326     | 5. 332 | 5. 337 | 5. 343 | 5. 349 | 5. 354 | 5. 360 | 5. 366 | 5. 372 | 5. 377 | 5. 383 | 1, 130 |
| 1, 140 | 5. 383     | 5. 389 | 5. 394 | 5. 400 | 5. 406 | 5. 411 | 5. 417 | 5. 423 | 5. 429 | 5. 434 | 5. 440 | 1, 140 |
| 1, 150 | 5. 440     | 5. 446 | 5. 451 | 5. 457 | 5. 463 | 5. 469 | 5. 474 | 5. 480 | 5. 486 | 5. 491 | 5. 497 | 1, 150 |
| 1, 160 | 5. 497     | 5. 503 | 5. 509 | 5. 514 | 5. 520 | 5. 526 | 5. 532 | 5. 537 | 5. 543 | 5. 549 | 5. 555 | 1, 160 |
| 1, 170 | 5. 555     | 5. 560 | 5. 566 | 5. 572 | 5. 577 | 5. 583 | 5. 589 | 5. 595 | 5. 600 | 5. 606 | 5. 612 | 1, 170 |
| 1, 180 | 5. 612     | 5. 617 | 5. 623 | 5. 629 | 5. 635 | 5. 640 | 5. 646 | 5. 652 | 5. 658 | 5. 663 | 5. 669 | 1, 180 |
| 1, 190 | 5. 669     | 5. 675 | 5. 681 | 5. 686 | 5. 692 | 5. 698 | 5. 704 | 5. 709 | 5. 715 | 5. 721 | 5. 726 | 1, 190 |
| 1, 200 | 5. 726     | 5. 732 | 5. 738 | 5. 744 | 5. 749 | 5. 755 | 5. 761 | 5. 767 | 5. 773 | 5. 778 | 5. 784 | 1, 200 |
| ° F    | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F    |

\*Based on the International Temperature Scale of 1948.

Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| °F     | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °F     |
|--------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|        | Millivolts |        |        |        |        |        |        |        |        |        |        |        |
| 1, 200 | 5. 726     | 5. 732 | 5. 738 | 5. 744 | 5. 749 | 5. 755 | 5. 761 | 5. 767 | 5. 773 | 5. 778 | 5. 784 | 1, 200 |
| 1, 210 | 5. 784     | 5. 790 | 5. 796 | 5. 801 | 5. 807 | 5. 813 | 5. 819 | 5. 824 | 5. 830 | 5. 836 | 5. 842 | 1, 210 |
| 1, 220 | 5. 842     | 5. 847 | 5. 853 | 5. 859 | 5. 865 | 5. 871 | 5. 876 | 5. 882 | 5. 888 | 5. 894 | 5. 899 | 1, 220 |
| 1, 230 | 5. 899     | 5. 905 | 5. 911 | 5. 917 | 5. 923 | 5. 928 | 5. 934 | 5. 940 | 5. 946 | 5. 951 | 5. 957 | 1, 230 |
| 1, 240 | 5. 957     | 5. 963 | 5. 969 | 5. 975 | 5. 980 | 5. 986 | 5. 992 | 5. 998 | 6. 004 | 6. 009 | 6. 015 | 1, 240 |
| 1, 250 | 6. 015     | 6. 021 | 6. 027 | 6. 033 | 6. 038 | 6. 044 | 6. 050 | 6. 056 | 6. 062 | 6. 067 | 6. 073 | 1, 250 |
| 1, 260 | 6. 073     | 6. 079 | 6. 085 | 6. 091 | 6. 096 | 6. 102 | 6. 108 | 6. 114 | 6. 120 | 6. 126 | 6. 131 | 1, 260 |
| 1, 270 | 6. 131     | 6. 137 | 6. 143 | 6. 149 | 6. 155 | 6. 161 | 6. 166 | 6. 172 | 6. 178 | 6. 184 | 6. 190 | 1, 270 |
| 1, 280 | 6. 190     | 6. 196 | 6. 201 | 6. 207 | 6. 213 | 6. 219 | 6. 225 | 6. 231 | 6. 236 | 6. 242 | 6. 248 | 1, 280 |
| 1, 290 | 6. 248     | 6. 254 | 6. 260 | 6. 266 | 6. 271 | 6. 277 | 6. 283 | 6. 289 | 6. 295 | 6. 301 | 6. 307 | 1, 290 |
| 1, 300 | 6. 307     | 6. 312 | 6. 318 | 6. 324 | 6. 330 | 6. 336 | 6. 342 | 6. 348 | 6. 353 | 6. 359 | 6. 365 | 1, 300 |
| 1, 310 | 6. 365     | 6. 371 | 6. 377 | 6. 383 | 6. 389 | 6. 394 | 6. 400 | 6. 406 | 6. 412 | 6. 418 | 6. 424 | 1, 310 |
| 1, 320 | 6. 424     | 6. 430 | 6. 436 | 6. 441 | 6. 447 | 6. 453 | 6. 459 | 6. 465 | 6. 471 | 6. 477 | 6. 483 | 1, 320 |
| 1, 330 | 6. 483     | 6. 488 | 6. 494 | 6. 500 | 6. 506 | 6. 512 | 6. 518 | 6. 524 | 6. 530 | 6. 536 | 6. 542 | 1, 330 |
| 1, 340 | 6. 542     | 6. 547 | 6. 553 | 6. 559 | 6. 565 | 6. 571 | 6. 577 | 6. 583 | 6. 589 | 6. 595 | 6. 601 | 1, 340 |
| 1, 350 | 6. 601     | 6. 606 | 6. 612 | 6. 618 | 6. 624 | 6. 630 | 6. 636 | 6. 642 | 6. 648 | 6. 654 | 6. 660 | 1, 350 |
| 1, 360 | 6. 660     | 6. 666 | 6. 671 | 6. 677 | 6. 683 | 6. 689 | 6. 695 | 6. 701 | 6. 707 | 6. 713 | 6. 719 | 1, 360 |
| 1, 370 | 6. 719     | 6. 725 | 6. 731 | 6. 737 | 6. 743 | 6. 749 | 6. 754 | 6. 760 | 6. 766 | 6. 772 | 6. 778 | 1, 370 |
| 1, 380 | 6. 778     | 6. 784 | 6. 790 | 6. 796 | 6. 802 | 6. 808 | 6. 814 | 6. 820 | 6. 826 | 6. 832 | 6. 838 | 1, 380 |
| 1, 390 | 6. 838     | 6. 844 | 6. 850 | 6. 855 | 6. 861 | 6. 867 | 6. 873 | 6. 879 | 6. 885 | 6. 891 | 6. 897 | 1, 390 |
| 1, 400 | 6. 897     | 6. 903 | 6. 909 | 6. 915 | 6. 921 | 6. 927 | 6. 933 | 6. 939 | 6. 945 | 6. 951 | 6. 957 | 1, 400 |
| 1, 410 | 6. 957     | 6. 963 | 6. 969 | 6. 975 | 6. 981 | 6. 987 | 6. 993 | 6. 999 | 7. 005 | 7. 011 | 7. 017 | 1, 410 |
| 1, 420 | 7. 017     | 7. 023 | 7. 029 | 7. 034 | 7. 040 | 7. 046 | 7. 052 | 7. 058 | 7. 064 | 7. 070 | 7. 076 | 1, 420 |
| 1, 430 | 7. 076     | 7. 082 | 7. 088 | 7. 094 | 7. 100 | 7. 106 | 7. 112 | 7. 118 | 7. 124 | 7. 130 | 7. 136 | 1, 430 |
| 1, 440 | 7. 136     | 7. 142 | 7. 148 | 7. 154 | 7. 160 | 7. 166 | 7. 172 | 7. 178 | 7. 184 | 7. 190 | 7. 196 | 1, 440 |
| 1, 450 | 7. 196     | 7. 202 | 7. 208 | 7. 214 | 7. 220 | 7. 226 | 7. 233 | 7. 239 | 7. 245 | 7. 251 | 7. 257 | 1, 450 |
| 1, 460 | 7. 257     | 7. 263 | 7. 269 | 7. 275 | 7. 281 | 7. 287 | 7. 293 | 7. 299 | 7. 305 | 7. 311 | 7. 317 | 1, 460 |
| 1, 470 | 7. 317     | 7. 323 | 7. 329 | 7. 335 | 7. 341 | 7. 347 | 7. 353 | 7. 359 | 7. 365 | 7. 371 | 7. 377 | 1, 470 |
| 1, 480 | 7. 377     | 7. 383 | 7. 389 | 7. 395 | 7. 401 | 7. 407 | 7. 414 | 7. 420 | 7. 426 | 7. 432 | 7. 438 | 1, 480 |
| 1, 490 | 7. 438     | 7. 444 | 7. 450 | 7. 456 | 7. 462 | 7. 468 | 7. 474 | 7. 480 | 7. 486 | 7. 492 | 7. 498 | 1, 490 |
| 1, 500 | 7. 498     | 7. 504 | 7. 510 | 7. 517 | 7. 523 | 7. 529 | 7. 535 | 7. 541 | 7. 547 | 7. 553 | 7. 559 | 1, 500 |
| 1, 510 | 7. 559     | 7. 565 | 7. 571 | 7. 577 | 7. 583 | 7. 589 | 7. 596 | 7. 602 | 7. 608 | 7. 614 | 7. 620 | 1, 510 |
| 1, 520 | 7. 620     | 7. 626 | 7. 632 | 7. 638 | 7. 644 | 7. 650 | 7. 656 | 7. 662 | 7. 669 | 7. 675 | 7. 681 | 1, 520 |
| 1, 530 | 7. 681     | 7. 687 | 7. 693 | 7. 699 | 7. 705 | 7. 711 | 7. 717 | 7. 723 | 7. 730 | 7. 736 | 7. 742 | 1, 530 |
| 1, 540 | 7. 742     | 7. 748 | 7. 754 | 7. 760 | 7. 766 | 7. 772 | 7. 778 | 7. 785 | 7. 791 | 7. 797 | 7. 803 | 1, 540 |
| 1, 550 | 7. 803     | 7. 809 | 7. 815 | 7. 821 | 7. 827 | 7. 834 | 7. 840 | 7. 846 | 7. 852 | 7. 858 | 7. 864 | 1, 550 |
| 1, 560 | 7. 864     | 7. 870 | 7. 876 | 7. 882 | 7. 889 | 7. 895 | 7. 901 | 7. 907 | 7. 913 | 7. 919 | 7. 925 | 1, 560 |
| 1, 570 | 7. 925     | 7. 932 | 7. 938 | 7. 944 | 7. 950 | 7. 956 | 7. 962 | 7. 968 | 7. 975 | 7. 981 | 7. 987 | 1, 570 |
| 1, 580 | 7. 987     | 7. 993 | 7. 999 | 8. 005 | 8. 012 | 8. 018 | 8. 024 | 8. 030 | 8. 036 | 8. 042 | 8. 048 | 1, 580 |
| 1, 590 | 8. 048     | 8. 055 | 8. 061 | 8. 067 | 8. 073 | 8. 079 | 8. 085 | 8. 092 | 8. 098 | 8. 104 | 8. 110 | 1, 590 |
| 1, 600 | 8. 110     | 8. 116 | 8. 122 | 8. 129 | 8. 135 | 8. 141 | 8. 147 | 8. 153 | 8. 159 | 8. 166 | 8. 172 | 1, 600 |
| °F     | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °F     |

\*Based on the International Temperature Scale of 1948.



# Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F        | 0       | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° F    |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| Millivolts |         |         |         |         |         |         |         |         |         |         |         |        |
| 1, 600     | 8. 110  | 8. 116  | 8. 122  | 8. 129  | 8. 135  | 8. 141  | 8. 147  | 8. 153  | 8. 159  | 8. 166  | 8. 172  | 1, 600 |
| 1, 610     | 8. 172  | 8. 178  | 8. 184  | 8. 190  | 8. 197  | 8. 203  | 8. 209  | 8. 215  | 8. 221  | 8. 228  | 8. 234  | 1, 610 |
| 1, 620     | 8. 234  | 8. 240  | 8. 246  | 8. 252  | 8. 258  | 8. 265  | 8. 271  | 8. 277  | 8. 283  | 8. 289  | 8. 296  | 1, 620 |
| 1, 630     | 8. 296  | 8. 302  | 8. 308  | 8. 314  | 8. 320  | 8. 327  | 8. 333  | 8. 339  | 8. 345  | 8. 352  | 8. 358  | 1, 630 |
| 1, 640     | 8. 358  | 8. 364  | 8. 370  | 8. 376  | 8. 383  | 8. 389  | 8. 395  | 8. 401  | 8. 407  | 8. 414  | 8. 420  | 1, 640 |
| 1, 650     | 8. 420  | 8. 426  | 8. 432  | 8. 439  | 8. 445  | 8. 451  | 8. 457  | 8. 464  | 8. 470  | 8. 476  | 8. 482  | 1, 650 |
| 1, 660     | 8. 482  | 8. 488  | 8. 495  | 8. 501  | 8. 507  | 8. 513  | 8. 520  | 8. 526  | 8. 532  | 8. 538  | 8. 545  | 1, 660 |
| 1, 670     | 8. 545  | 8. 551  | 8. 557  | 8. 563  | 8. 570  | 8. 576  | 8. 582  | 8. 588  | 8. 595  | 8. 601  | 8. 607  | 1, 670 |
| 1, 680     | 8. 607  | 8. 613  | 8. 620  | 8. 626  | 8. 632  | 8. 638  | 8. 645  | 8. 651  | 8. 657  | 8. 663  | 8. 670  | 1, 680 |
| 1, 690     | 8. 670  | 8. 676  | 8. 682  | 8. 689  | 8. 695  | 8. 701  | 8. 707  | 8. 714  | 8. 720  | 8. 726  | 8. 732  | 1, 690 |
| 1, 700     | 8. 732  | 8. 739  | 8. 745  | 8. 751  | 8. 758  | 8. 764  | 8. 770  | 8. 776  | 8. 783  | 8. 789  | 8. 795  | 1, 700 |
| 1, 710     | 8. 795  | 8. 802  | 8. 808  | 8. 814  | 8. 820  | 8. 827  | 8. 833  | 8. 839  | 8. 846  | 8. 852  | 8. 858  | 1, 710 |
| 1, 720     | 8. 858  | 8. 864  | 8. 871  | 8. 877  | 8. 883  | 8. 890  | 8. 896  | 8. 902  | 8. 909  | 8. 915  | 8. 921  | 1, 720 |
| 1, 730     | 8. 921  | 8. 927  | 8. 934  | 8. 940  | 8. 946  | 8. 953  | 8. 959  | 8. 965  | 8. 972  | 8. 978  | 8. 984  | 1, 730 |
| 1, 740     | 8. 984  | 8. 991  | 8. 997  | 9. 003  | 9. 010  | 9. 016  | 9. 022  | 9. 029  | 9. 035  | 9. 041  | 9. 048  | 1, 740 |
| 1, 750     | 9. 048  | 9. 054  | 9. 060  | 9. 067  | 9. 073  | 9. 079  | 9. 086  | 9. 092  | 9. 098  | 9. 105  | 9. 111  | 1, 750 |
| 1, 760     | 9. 111  | 9. 117  | 9. 124  | 9. 130  | 9. 136  | 9. 143  | 9. 149  | 9. 155  | 9. 162  | 9. 168  | 9. 174  | 1, 760 |
| 1, 770     | 9. 174  | 9. 181  | 9. 187  | 9. 193  | 9. 200  | 9. 206  | 9. 212  | 9. 219  | 9. 225  | 9. 232  | 9. 238  | 1, 770 |
| 1, 780     | 9. 238  | 9. 244  | 9. 251  | 9. 257  | 9. 263  | 9. 270  | 9. 276  | 9. 282  | 9. 289  | 9. 295  | 9. 302  | 1, 780 |
| 1, 790     | 9. 302  | 9. 308  | 9. 314  | 9. 321  | 9. 327  | 9. 333  | 9. 340  | 9. 346  | 9. 353  | 9. 359  | 9. 365  | 1, 790 |
| 1, 800     | 9. 365  | 9. 372  | 9. 378  | 9. 384  | 9. 391  | 9. 397  | 9. 404  | 9. 410  | 9. 416  | 9. 423  | 9. 429  | 1, 800 |
| 1, 810     | 9. 429  | 9. 436  | 9. 442  | 9. 448  | 9. 455  | 9. 461  | 9. 468  | 9. 474  | 9. 480  | 9. 487  | 9. 493  | 1, 810 |
| 1, 820     | 9. 493  | 9. 500  | 9. 506  | 9. 512  | 9. 519  | 9. 525  | 9. 532  | 9. 538  | 9. 544  | 9. 551  | 9. 557  | 1, 820 |
| 1, 830     | 9. 557  | 9. 564  | 9. 570  | 9. 576  | 9. 583  | 9. 589  | 9. 596  | 9. 602  | 9. 609  | 9. 615  | 9. 621  | 1, 830 |
| 1, 840     | 9. 621  | 9. 628  | 9. 634  | 9. 641  | 9. 647  | 9. 654  | 9. 660  | 9. 666  | 9. 673  | 9. 679  | 9. 686  | 1, 840 |
| 1, 850     | 9. 686  | 9. 692  | 9. 699  | 9. 705  | 9. 711  | 9. 718  | 9. 724  | 9. 731  | 9. 737  | 9. 744  | 9. 750  | 1, 850 |
| 1, 860     | 9. 750  | 9. 757  | 9. 763  | 9. 769  | 9. 776  | 9. 782  | 9. 789  | 9. 795  | 9. 802  | 9. 808  | 9. 815  | 1, 860 |
| 1, 870     | 9. 815  | 9. 821  | 9. 828  | 9. 834  | 9. 840  | 9. 847  | 9. 853  | 9. 860  | 9. 866  | 9. 873  | 9. 879  | 1, 870 |
| 1, 880     | 9. 879  | 9. 886  | 9. 892  | 9. 899  | 9. 905  | 9. 912  | 9. 918  | 9. 925  | 9. 931  | 9. 937  | 9. 944  | 1, 880 |
| 1, 890     | 9. 944  | 9. 950  | 9. 957  | 9. 963  | 9. 970  | 9. 976  | 9. 983  | 9. 989  | 9. 996  | 10. 002 | 10. 009 | 1, 890 |
| 1, 900     | 10. 009 | 10. 015 | 10. 022 | 10. 028 | 10. 035 | 10. 041 | 10. 048 | 10. 054 | 10. 061 | 10. 067 | 10. 074 | 1, 900 |
| 1, 910     | 10. 074 | 10. 080 | 10. 087 | 10. 093 | 10. 100 | 10. 106 | 10. 113 | 10. 119 | 10. 126 | 10. 132 | 10. 139 | 1, 910 |
| 1, 920     | 10. 139 | 10. 145 | 10. 152 | 10. 158 | 10. 165 | 10. 171 | 10. 178 | 10. 184 | 10. 191 | 10. 197 | 10. 204 | 1, 920 |
| 1, 930     | 10. 204 | 10. 210 | 10. 217 | 10. 223 | 10. 230 | 10. 237 | 10. 243 | 10. 250 | 10. 256 | 10. 263 | 10. 269 | 1, 930 |
| 1, 940     | 10. 269 | 10. 276 | 10. 282 | 10. 289 | 10. 295 | 10. 302 | 10. 308 | 10. 315 | 10. 321 | 10. 328 | 10. 334 | 1, 940 |
| 1, 950     | 10. 334 | 10. 341 | 10. 348 | 10. 354 | 10. 361 | 10. 367 | 10. 374 | 10. 380 | 10. 387 | 10. 393 | 10. 400 | 1, 950 |
| 1, 960     | 10. 400 | 10. 406 | 10. 413 | 10. 420 | 10. 426 | 10. 433 | 10. 439 | 10. 446 | 10. 452 | 10. 459 | 10. 465 | 1, 960 |
| 1, 970     | 10. 465 | 10. 472 | 10. 478 | 10. 485 | 10. 492 | 10. 498 | 10. 505 | 10. 511 | 10. 518 | 10. 524 | 10. 531 | 1, 970 |
| 1, 980     | 10. 531 | 10. 538 | 10. 544 | 10. 551 | 10. 557 | 10. 564 | 10. 570 | 10. 577 | 10. 583 | 10. 590 | 10. 597 | 1, 980 |
| 1, 990     | 10. 597 | 10. 603 | 10. 610 | 10. 616 | 10. 623 | 10. 629 | 10. 636 | 10. 643 | 10. 649 | 10. 656 | 10. 662 | 1, 990 |
| 2, 000     | 10. 662 | 10. 669 | 10. 675 | 10. 682 | 10. 689 | 10. 695 | 10. 702 | 10. 708 | 10. 715 | 10. 722 | 10. 728 | 2, 000 |
| ° F        | 0       | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° F    |

\*Based on the International Temperature Scale of 1948.



# Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F        | 0       | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° F    |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| Millivolts |         |         |         |         |         |         |         |         |         |         |         |        |
| 2, 000     | 10. 662 | 10. 669 | 10. 675 | 10. 682 | 10. 689 | 10. 695 | 10. 702 | 10. 708 | 10. 715 | 10. 722 | 10. 728 |        |
| 2, 010     | 10. 728 | 10. 735 | 10. 741 | 10. 748 | 10. 754 | 10. 761 | 10. 768 | 10. 774 | 10. 781 | 10. 787 | 10. 794 |        |
| 2, 020     | 10. 794 | 10. 801 | 10. 807 | 10. 814 | 10. 820 | 10. 827 | 10. 834 | 10. 840 | 10. 847 | 10. 853 | 10. 860 |        |
| 2, 030     | 10. 860 | 10. 866 | 10. 873 | 10. 880 | 10. 886 | 10. 893 | 10. 899 | 10. 906 | 10. 913 | 10. 919 | 10. 926 |        |
| 2, 040     | 10. 926 | 10. 932 | 10. 939 | 10. 946 | 10. 952 | 10. 959 | 10. 966 | 10. 972 | 10. 979 | 10. 985 | 10. 992 |        |
| 2, 050     | 10. 992 | 10. 999 | 11. 005 | 11. 012 | 11. 018 | 11. 025 | 11. 032 | 11. 038 | 11. 045 | 11. 051 | 11. 058 |        |
| 2, 060     | 11. 058 | 11. 065 | 11. 071 | 11. 078 | 11. 085 | 11. 091 | 11. 098 | 11. 104 | 11. 111 | 11. 118 | 11. 124 |        |
| 2, 070     | 11. 124 | 11. 131 | 11. 137 | 11. 144 | 11. 151 | 11. 157 | 11. 164 | 11. 171 | 11. 177 | 11. 184 | 11. 190 |        |
| 2, 080     | 11. 190 | 11. 197 | 11. 204 | 11. 210 | 11. 217 | 11. 224 | 11. 230 | 11. 237 | 11. 243 | 11. 250 | 11. 257 |        |
| 2, 090     | 11. 257 | 11. 263 | 11. 270 | 11. 277 | 11. 283 | 11. 290 | 11. 296 | 11. 303 | 11. 310 | 11. 316 | 11. 323 |        |
| 2, 100     | 11. 323 | 11. 330 | 11. 336 | 11. 343 | 11. 350 | 11. 356 | 11. 363 | 11. 369 | 11. 376 | 11. 383 | 11. 389 | 2, 100 |
| 2, 110     | 11. 389 | 11. 396 | 11. 403 | 11. 409 | 11. 416 | 11. 423 | 11. 429 | 11. 436 | 11. 443 | 11. 449 | 11. 456 | 2, 110 |
| 2, 120     | 11. 456 | 11. 462 | 11. 469 | 11. 476 | 11. 482 | 11. 489 | 11. 496 | 11. 502 | 11. 509 | 11. 516 | 11. 522 | 2, 120 |
| 2, 130     | 11. 522 | 11. 529 | 11. 536 | 11. 542 | 11. 549 | 11. 556 | 11. 562 | 11. 569 | 11. 575 | 11. 582 | 11. 589 | 2, 130 |
| 2, 140     | 11. 589 | 11. 595 | 11. 602 | 11. 609 | 11. 615 | 11. 622 | 11. 629 | 11. 635 | 11. 642 | 11. 649 | 11. 655 | 2, 140 |
| 2, 150     | 11. 655 | 11. 662 | 11. 669 | 11. 675 | 11. 682 | 11. 689 | 11. 695 | 11. 702 | 11. 709 | 11. 715 | 11. 722 | 2, 150 |
| 2, 160     | 11. 722 | 11. 729 | 11. 735 | 11. 742 | 11. 749 | 11. 755 | 11. 762 | 11. 769 | 11. 775 | 11. 782 | 11. 789 | 2, 160 |
| 2, 170     | 11. 789 | 11. 795 | 11. 802 | 11. 809 | 11. 815 | 11. 822 | 11. 829 | 11. 835 | 11. 842 | 11. 848 | 11. 855 | 2, 170 |
| 2, 180     | 11. 855 | 11. 862 | 11. 868 | 11. 875 | 11. 882 | 11. 888 | 11. 895 | 11. 902 | 11. 908 | 11. 915 | 11. 922 | 2, 180 |
| 2, 190     | 11. 922 | 11. 928 | 11. 935 | 11. 942 | 11. 949 | 11. 955 | 11. 962 | 11. 969 | 11. 975 | 11. 982 | 11. 989 | 2, 190 |
| 2, 200     | 11. 989 | 11. 995 | 12. 002 | 12. 009 | 12. 015 | 12. 022 | 12. 029 | 12. 035 | 12. 042 | 12. 049 | 12. 055 | 2, 200 |
| 2, 210     | 12. 055 | 12. 062 | 12. 069 | 12. 075 | 12. 082 | 12. 089 | 12. 095 | 12. 102 | 12. 109 | 12. 115 | 12. 122 | 2, 210 |
| 2, 220     | 12. 122 | 12. 129 | 12. 135 | 12. 142 | 12. 149 | 12. 155 | 12. 162 | 12. 169 | 12. 175 | 12. 182 | 12. 189 | 2, 220 |
| 2, 230     | 12. 189 | 12. 196 | 12. 202 | 12. 209 | 12. 216 | 12. 222 | 12. 229 | 12. 236 | 12. 242 | 12. 249 | 12. 256 | 2, 230 |
| 2, 240     | 12. 256 | 12. 262 | 12. 269 | 12. 276 | 12. 282 | 12. 289 | 12. 296 | 12. 302 | 12. 309 | 12. 316 | 12. 322 | 2, 240 |
| 2, 250     | 12. 322 | 12. 329 | 12. 336 | 12. 342 | 12. 349 | 12. 356 | 12. 363 | 12. 369 | 12. 376 | 12. 383 | 12. 389 | 2, 250 |
| 2, 260     | 12. 389 | 12. 396 | 12. 403 | 12. 409 | 12. 416 | 12. 423 | 12. 429 | 12. 436 | 12. 443 | 12. 449 | 12. 456 | 2, 260 |
| 2, 270     | 12. 456 | 12. 463 | 12. 470 | 12. 476 | 12. 483 | 12. 490 | 12. 496 | 12. 503 | 12. 510 | 12. 516 | 12. 523 | 2, 270 |
| 2, 280     | 12. 523 | 12. 530 | 12. 536 | 12. 543 | 12. 550 | 12. 556 | 12. 563 | 12. 570 | 12. 577 | 12. 583 | 12. 590 | 2, 280 |
| 2, 290     | 12. 590 | 12. 597 | 12. 603 | 12. 610 | 12. 617 | 12. 623 | 12. 630 | 12. 637 | 12. 643 | 12. 650 | 12. 657 | 2, 290 |
| 2, 300     | 12. 657 | 12. 663 | 12. 670 | 12. 677 | 12. 684 | 12. 690 | 12. 697 | 12. 704 | 12. 710 | 12. 717 | 12. 724 | 2, 300 |
| 2, 310     | 12. 724 | 12. 730 | 12. 737 | 12. 744 | 12. 750 | 12. 757 | 12. 764 | 12. 770 | 12. 777 | 12. 784 | 12. 790 | 2, 310 |
| 2, 320     | 12. 790 | 12. 797 | 12. 804 | 12. 810 | 12. 817 | 12. 824 | 12. 830 | 12. 837 | 12. 844 | 12. 851 | 12. 857 | 2, 320 |
| 2, 330     | 12. 857 | 12. 864 | 12. 871 | 12. 877 | 12. 884 | 12. 891 | 12. 897 | 12. 904 | 12. 911 | 12. 917 | 12. 924 | 2, 330 |
| 2, 340     | 12. 924 | 12. 931 | 12. 937 | 12. 944 | 12. 951 | 12. 957 | 12. 964 | 12. 971 | 12. 977 | 12. 984 | 12. 991 | 2, 340 |
| 2, 350     | 12. 991 | 12. 997 | 13. 004 | 13. 011 | 13. 018 | 13. 024 | 13. 031 | 13. 038 | 13. 044 | 13. 051 | 13. 058 | 2, 350 |
| 2, 360     | 13. 058 | 13. 064 | 13. 071 | 13. 078 | 13. 084 | 13. 091 | 13. 098 | 13. 104 | 13. 111 | 13. 118 | 13. 124 | 2, 360 |
| 2, 370     | 13. 124 | 13. 131 | 13. 138 | 13. 144 | 13. 151 | 13. 158 | 13. 164 | 13. 171 | 13. 178 | 13. 184 | 13. 191 | 2, 370 |
| 2, 380     | 13. 191 | 13. 198 | 13. 204 | 13. 211 | 13. 218 | 13. 224 | 13. 231 | 13. 238 | 13. 244 | 13. 251 | 13. 258 | 2, 380 |
| 2, 390     | 13. 258 | 13. 265 | 13. 271 | 13. 278 | 13. 285 | 13. 291 | 13. 298 | 13. 305 | 13. 311 | 13. 318 | 13. 325 | 2, 390 |
| 2, 400     | 13. 325 | 13. 331 | 13. 338 | 13. 345 | 13. 351 | 13. 358 | 13. 365 | 13. 371 | 13. 378 | 13. 385 | 13. 391 | 2, 400 |
| ° F        | 0       | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° F    |

\*Based on the International Temperature Scale of 1948.

Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F                                                                                                      | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° F                                                                                                          |
|----------------------------------------------------------------------------------------------------------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------------------------------------------------------------------------------------------------------------|
| 2, 400<br>2, 410<br>2, 420<br>2, 430<br><br>2, 440<br>2, 450<br>2, 460<br><br>2, 470<br>2, 480<br>2, 490 | Millivolts |         |         |         |         |         |         |         |         |         |         | 2, 400<br><br>2, 410<br>2, 420<br>2, 430<br><br>2, 440<br>2, 450<br>2, 460<br><br>2, 470<br>2, 480<br>2, 490 |
|                                                                                                          | 13. 325    | 13. 331 | 13. 338 | 13. 345 | 13. 351 | 13. 358 | 13. 365 | 13. 371 | 13. 378 | 13. 385 | 13. 391 |                                                                                                              |
|                                                                                                          | 13. 391    | 13. 398 | 13. 405 | 13. 411 | 13. 418 | 13. 425 | 13. 431 | 13. 438 | 13. 445 | 13. 451 | 13. 458 |                                                                                                              |
|                                                                                                          | 13. 458    | 13. 465 | 13. 471 | 13. 478 | 13. 485 | 13. 491 | 13. 498 | 13. 505 | 13. 511 | 13. 518 | 13. 525 |                                                                                                              |
|                                                                                                          | 13. 525    | 13. 531 | 13. 538 | 13. 545 | 13. 551 | 13. 558 | 13. 565 | 13. 571 | 13. 578 | 13. 585 | 13. 591 |                                                                                                              |
|                                                                                                          | 13. 591    | 13. 598 | 13. 605 | 13. 611 | 13. 618 | 13. 625 | 13. 631 | 13. 638 | 13. 645 | 13. 651 | 13. 658 |                                                                                                              |
|                                                                                                          | 13. 658    | 13. 665 | 13. 671 | 13. 678 | 13. 685 | 13. 691 | 13. 698 | 13. 705 | 13. 711 | 13. 718 | 13. 725 |                                                                                                              |
|                                                                                                          | 13. 725    | 13. 731 | 13. 738 | 13. 745 | 13. 751 | 13. 758 | 13. 765 | 13. 771 | 13. 778 | 13. 785 | 13. 791 |                                                                                                              |
|                                                                                                          | 13. 791    | 13. 798 | 13. 805 | 13. 811 | 13. 818 | 13. 825 | 13. 831 | 13. 838 | 13. 845 | 13. 851 | 13. 858 |                                                                                                              |
|                                                                                                          | 13. 858    | 13. 865 | 13. 871 | 13. 878 | 13. 885 | 13. 891 | 13. 898 | 13. 905 | 13. 911 | 13. 918 | 13. 924 |                                                                                                              |
|                                                                                                          | 13. 924    | 13. 931 | 13. 938 | 13. 944 | 13. 951 | 13. 958 | 13. 964 | 13. 971 | 13. 978 | 13. 984 | 13. 991 |                                                                                                              |
| 2, 500                                                                                                   | 13. 991    | 13. 998 | 14. 004 | 14. 011 | 14. 018 | 14. 024 | 14. 031 | 14. 038 | 14. 044 | 14. 051 | 14. 058 | 2, 500                                                                                                       |
| 2, 510                                                                                                   | 14. 058    | 14. 064 | 14. 071 | 14. 078 | 14. 084 | 14. 091 | 14. 098 | 14. 104 | 14. 111 | 14. 118 | 14. 124 | 2, 510                                                                                                       |
| 2, 520                                                                                                   | 14. 124    | 14. 131 | 14. 137 | 14. 144 | 14. 151 | 14. 157 | 14. 164 | 14. 171 | 14. 177 | 14. 184 | 14. 191 | 2, 520                                                                                                       |
| 2, 530                                                                                                   | 14. 191    | 14. 197 | 14. 204 | 14. 211 | 14. 217 | 14. 224 | 14. 231 | 14. 237 | 14. 244 | 14. 251 | 14. 257 | 2, 530                                                                                                       |
| 2, 540                                                                                                   | 14. 257    | 14. 264 | 14. 271 | 14. 277 | 14. 284 | 14. 290 | 14. 297 | 14. 304 | 14. 310 | 14. 317 | 14. 324 | 2, 540                                                                                                       |
| 2, 550                                                                                                   | 14. 324    | 14. 330 | 14. 337 | 14. 344 | 14. 350 | 14. 357 | 14. 364 | 14. 370 | 14. 377 | 14. 384 | 14. 390 | 2, 550                                                                                                       |
| 2, 560                                                                                                   | 14. 390    | 14. 397 | 14. 403 | 14. 410 | 14. 417 | 14. 423 | 14. 430 | 14. 437 | 14. 443 | 14. 450 | 14. 457 | 2, 560                                                                                                       |
| 2, 570                                                                                                   | 14. 457    | 14. 463 | 14. 470 | 14. 477 | 14. 483 | 14. 490 | 14. 497 | 14. 503 | 14. 510 | 14. 516 | 14. 523 | 2, 570                                                                                                       |
| 2, 580                                                                                                   | 14. 523    | 14. 530 | 14. 536 | 14. 543 | 14. 550 | 14. 556 | 14. 563 | 14. 570 | 14. 576 | 14. 583 | 14. 589 | 2, 580                                                                                                       |
| 2, 590                                                                                                   | 14. 589    | 14. 596 | 14. 603 | 14. 609 | 14. 616 | 14. 623 | 14. 629 | 14. 636 | 14. 643 | 14. 649 | 14. 656 | 2, 590                                                                                                       |
| 2, 600                                                                                                   | 14. 656    | 14. 663 | 14. 669 | 14. 676 | 14. 682 | 14. 689 | 14. 696 | 14. 702 | 14. 709 | 14. 716 | 14. 722 | 2, 600                                                                                                       |
| 2, 610                                                                                                   | 14. 722    | 14. 729 | 14. 736 | 14. 742 | 14. 749 | 14. 755 | 14. 762 | 14. 769 | 14. 775 | 14. 782 | 14. 789 | 2, 610                                                                                                       |
| 2, 620                                                                                                   | 14. 789    | 14. 795 | 14. 802 | 14. 809 | 14. 815 | 14. 822 | 14. 828 | 14. 835 | 14. 842 | 14. 848 | 14. 855 | 2, 620                                                                                                       |
| 2, 630                                                                                                   | 14. 855    | 14. 862 | 14. 868 | 14. 875 | 14. 881 | 14. 888 | 14. 895 | 14. 901 | 14. 908 | 14. 915 | 14. 921 | 2, 630                                                                                                       |
| 2, 640                                                                                                   | 14. 921    | 14. 928 | 14. 935 | 14. 941 | 14. 948 | 14. 954 | 14. 961 | 14. 968 | 14. 974 | 14. 981 | 14. 988 | 2, 640                                                                                                       |
| 2, 650                                                                                                   | 14. 988    | 14. 994 | 15. 001 | 15. 007 | 15. 014 | 15. 021 | 15. 027 | 15. 034 | 15. 041 | 15. 047 | 15. 054 | 2, 650                                                                                                       |
| 2, 660                                                                                                   | 15. 054    | 15. 060 | 15. 067 | 15. 074 | 15. 080 | 15. 087 | 15. 094 | 15. 100 | 15. 107 | 15. 113 | 15. 120 | 2, 660                                                                                                       |
| 2, 670                                                                                                   | 15. 120    | 15. 127 | 15. 133 | 15. 140 | 15. 147 | 15. 153 | 15. 160 | 15. 166 | 15. 173 | 15. 180 | 15. 186 | 2, 670                                                                                                       |
| 2, 680                                                                                                   | 15. 186    | 15. 193 | 15. 200 | 15. 206 | 15. 213 | 15. 219 | 15. 226 | 15. 233 | 15. 239 | 15. 246 | 15. 253 | 2, 680                                                                                                       |
| 2, 690                                                                                                   | 15. 253    | 15. 259 | 15. 266 | 15. 272 | 15. 279 | 15. 286 | 15. 292 | 15. 299 | 15. 305 | 15. 312 | 15. 319 | 2, 690                                                                                                       |
| 2, 700                                                                                                   | 15. 319    | 15. 325 | 15. 332 | 15. 339 | 15. 345 | 15. 352 | 15. 358 | 15. 365 | 15. 372 | 15. 378 | 15. 385 | 2, 700                                                                                                       |
| 2, 710                                                                                                   | 15. 385    | 15. 391 | 15. 398 | 15. 405 | 15. 411 | 15. 418 | 15. 425 | 15. 431 | 15. 438 | 15. 444 | 15. 451 | 2, 710                                                                                                       |
| 2, 720                                                                                                   | 15. 451    | 15. 458 | 15. 464 | 15. 471 | 15. 477 | 15. 484 | 15. 491 | 15. 497 | 15. 504 | 15. 510 | 15. 517 | 2, 720                                                                                                       |
| 2, 730                                                                                                   | 15. 517    | 15. 524 | 15. 530 | 15. 537 | 15. 544 | 15. 550 | 15. 557 | 15. 563 | 15. 570 | 15. 577 | 15. 583 | 2, 730                                                                                                       |
| 2, 740                                                                                                   | 15. 583    | 15. 590 | 15. 596 | 15. 603 | 15. 610 | 15. 616 | 15. 623 | 15. 629 | 15. 636 | 15. 643 | 15. 649 | 2, 740                                                                                                       |
| 2, 750                                                                                                   | 15. 649    | 15. 656 | 15. 662 | 15. 669 | 15. 676 | 15. 682 | 15. 689 | 15. 695 | 15. 702 | 15. 709 | 15. 715 | 2, 750                                                                                                       |
| 2, 760                                                                                                   | 15. 715    | 15. 722 | 15. 728 | 15. 735 | 15. 742 | 15. 748 | 15. 755 | 15. 761 | 15. 768 | 15. 775 | 15. 781 | 2, 760                                                                                                       |
| 2, 770                                                                                                   | 15. 781    | 15. 788 | 15. 794 | 15. 801 | 15. 808 | 15. 814 | 15. 821 | 15. 827 | 15. 834 | 15. 841 | 15. 847 | 2, 770                                                                                                       |
| 2, 780                                                                                                   | 15. 847    | 15. 854 | 15. 860 | 15. 867 | 15. 874 | 15. 880 | 15. 887 | 15. 893 | 15. 900 | 15. 907 | 15. 913 | 2, 780                                                                                                       |
| 2, 790                                                                                                   | 15. 913    | 15. 920 | 15. 926 | 15. 933 | 15. 940 | 15. 946 | 15. 953 | 15. 959 | 15. 966 | 15. 973 | 15. 979 | 2, 790                                                                                                       |
| 2, 800                                                                                                   | 15. 979    | 15. 986 | 15. 992 | 15. 999 | 16. 006 | 16. 012 | 16. 019 | 16. 025 | 16. 032 | 16. 038 | 16. 045 | 2, 800                                                                                                       |
| ° F                                                                                                      | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° F                                                                                                          |

\*Based on the International Temperature Scale of 1948.



Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| °F     | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | °F     |
|--------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
|        | Millivolts |         |         |         |         |         |         |         |         |         |         |        |
| 2, 800 | 15. 979    | 15. 986 | 15. 992 | 15. 999 | 16. 006 | 16. 012 | 16. 019 | 16. 025 | 16. 032 | 16. 038 | 16. 045 | 2, 800 |
| 2, 810 | 16. 045    | 16. 052 | 16. 058 | 16. 065 | 16. 071 | 16. 078 | 16. 085 | 16. 091 | 16. 098 | 16. 104 | 16. 111 | 2, 810 |
| 2, 820 | 16. 111    | 16. 117 | 16. 124 | 16. 131 | 16. 137 | 16. 144 | 16. 150 | 16. 157 | 16. 164 | 16. 170 | 16. 177 | 2, 820 |
| 2, 830 | 16. 177    | 16. 183 | 16. 190 | 16. 196 | 16. 203 | 16. 210 | 16. 216 | 16. 223 | 16. 229 | 16. 236 | 16. 243 | 2, 830 |
| 2, 840 | 16. 243    | 16. 249 | 16. 256 | 16. 262 | 16. 269 | 16. 275 | 16. 282 | 16. 289 | 16. 295 | 16. 302 | 16. 308 | 2, 840 |
| 2, 850 | 16. 308    | 16. 315 | 16. 322 | 16. 328 | 16. 335 | 16. 341 | 16. 348 | 16. 354 | 16. 361 | 16. 368 | 16. 374 | 2, 850 |
| 2, 860 | 16. 374    | 16. 381 | 16. 387 | 16. 394 | 16. 400 | 16. 407 | 16. 414 | 16. 420 | 16. 427 | 16. 433 | 16. 440 | 2, 860 |
| 2, 870 | 16. 440    | 16. 446 | 16. 453 | 16. 460 | 16. 466 | 16. 473 | 16. 479 | 16. 486 | 16. 492 | 16. 499 | 16. 506 | 2, 870 |
| 2, 880 | 16. 506    | 16. 512 | 16. 519 | 16. 525 | 16. 532 | 16. 538 | 16. 545 | 16. 552 | 16. 558 | 16. 565 | 16. 571 | 2, 880 |
| 2, 890 | 16. 571    | 16. 578 | 16. 584 | 16. 591 | 16. 597 | 16. 604 | 16. 611 | 16. 617 | 16. 624 | 16. 630 | 16. 637 | 2, 890 |
| 2, 900 | 16. 637    | 16. 643 | 16. 650 | 16. 657 | 16. 663 | 16. 670 | 16. 676 | 16. 683 | 16. 689 | 16. 696 | 16. 702 | 2, 900 |
| 2, 910 | 16. 702    | 16. 709 | 16. 716 | 16. 722 | 16. 729 | 16. 735 | 16. 742 | 16. 748 | 16. 755 | 16. 761 | 16. 768 | 2, 910 |
| 2, 920 | 16. 768    | 16. 775 | 16. 781 | 16. 788 | 16. 794 | 16. 801 | 16. 807 | 16. 814 | 16. 820 | 16. 827 | 16. 834 | 2, 920 |
| 2, 930 | 16. 834    | 16. 840 | 16. 847 | 16. 853 | 16. 860 | 16. 866 | 16. 873 | 16. 879 | 16. 886 | 16. 893 | 16. 899 | 2, 930 |
| 2, 940 | 16. 899    | 16. 906 | 16. 912 | 16. 919 | 16. 925 | 16. 932 | 16. 938 | 16. 945 | 16. 952 | 16. 958 | 16. 965 | 2, 940 |
| 2, 950 | 16. 965    | 16. 971 | 16. 978 | 16. 984 | 16. 991 | 16. 997 | 17. 004 | 17. 010 | 17. 017 | 17. 023 | 17. 030 | 2, 950 |
| 2, 960 | 17. 030    | 17. 037 | 17. 043 | 17. 050 | 17. 056 | 17. 063 | 17. 069 | 17. 076 | 17. 082 | 17. 089 | 17. 095 | 2, 960 |
| 2, 970 | 17. 095    | 17. 102 | 17. 109 | 17. 115 | 17. 122 | 17. 128 | 17. 135 | 17. 141 | 17. 148 | 17. 154 | 17. 161 | 2, 970 |
| 2, 980 | 17. 161    | 17. 167 | 17. 174 | 17. 180 | 17. 187 | 17. 194 | 17. 200 | 17. 207 | 17. 213 | 17. 220 | 17. 226 | 2, 980 |
| 2, 990 | 17. 226    | 17. 233 | 17. 239 | 17. 246 | 17. 252 | 17. 259 | 17. 265 | 17. 272 | 17. 278 | 17. 285 | 17. 292 | 2, 990 |
| 3, 000 | 17. 292    | 17. 298 | 17. 305 | 17. 311 | 17. 318 | 17. 324 | 17. 331 | 17. 337 | 17. 344 | 17. 350 | 17. 357 | 3, 000 |
| 3, 010 | 17. 357    | 17. 363 | 17. 370 | 17. 376 | 17. 383 | 17. 389 | 17. 396 | 17. 402 | 17. 409 | 17. 416 | 17. 422 | 3, 010 |
| 3, 020 | 17. 422    | 17. 429 | 17. 435 | 17. 442 | 17. 448 | 17. 455 | 17. 461 | 17. 468 | 17. 474 | 17. 481 | 17. 487 | 3, 020 |
| 3, 030 | 17. 487    | 17. 494 | 17. 500 | 17. 507 | 17. 513 | 17. 520 | 17. 526 | 17. 533 | 17. 539 | 17. 546 | 17. 552 | 3, 030 |
| 3, 040 | 17. 552    | 17. 559 | 17. 565 | 17. 572 | 17. 578 | 17. 585 | 17. 592 | 17. 598 | 17. 605 | 17. 611 | 17. 618 | 3, 040 |
| 3, 050 | 17. 618    | 17. 624 | 17. 631 | 17. 637 | 17. 644 | 17. 650 | 17. 657 | 17. 663 | 17. 670 | 17. 676 | 17. 683 | 3, 050 |
| 3, 060 | 17. 683    | 17. 689 | 17. 696 | 17. 702 | 17. 709 | 17. 715 | 17. 722 | 17. 728 | 17. 735 | 17. 741 | 17. 748 | 3, 060 |
| 3, 070 | 17. 748    | 17. 754 | 17. 761 | 17. 767 | 17. 774 | 17. 780 | 17. 787 | 17. 793 | 17. 800 | 17. 806 | 17. 813 | 3, 070 |
| 3, 080 | 17. 813    | 17. 819 | 17. 826 | 17. 832 | 17. 839 | 17. 845 | 17. 852 | 17. 858 | 17. 865 | 17. 871 | 17. 878 | 3, 080 |
| 3, 090 | 17. 878    | 17. 884 | 17. 891 | 17. 897 | 17. 904 | 17. 910 | 17. 917 | 17. 923 | 17. 930 | 17. 936 | 17. 943 | 3, 090 |
| 3, 100 | 17. 943    | 17. 949 | 17. 956 | 17. 962 | 17. 969 | 17. 975 | 17. 982 | 17. 988 | 17. 995 | 18. 001 | 18. 008 | 3, 100 |
| 3, 110 | 18. 008    | 18. 014 | 18. 021 | 18. 027 | 18. 034 | 18. 040 | 18. 047 | 18. 053 | 18. 060 | 18. 066 | 18. 073 | 3, 110 |
| 3, 120 | 18. 073    | 18. 079 | 18. 086 | 18. 092 | 18. 098 | 18. 105 | 18. 111 | 18. 118 | 18. 124 | 18. 131 | 18. 137 | 3, 120 |
| 3, 130 | 18. 137    | 18. 144 | 18. 150 | 18. 157 | 18. 163 | 18. 170 | 18. 176 | 18. 183 | 18. 189 | 18. 196 | 18. 202 | 3, 130 |
| 3, 140 | 18. 202    | 18. 209 | 18. 215 | 18. 222 | 18. 228 | 18. 235 | 18. 241 | 18. 248 | 18. 254 | 18. 260 | 18. 267 | 3, 140 |
| 3, 150 | 18. 267    | 18. 273 | 18. 280 | 18. 286 | 18. 293 | 18. 299 | 18. 306 | 18. 312 | 18. 319 | 18. 325 | 18. 332 | 3, 150 |
| 3, 160 | 18. 332    | 18. 338 | 18. 345 | 18. 351 | 18. 358 | 18. 364 | 18. 371 | 18. 377 | 18. 383 | 18. 390 | 18. 396 | 3, 160 |
| 3, 170 | 18. 396    | 18. 403 | 18. 409 | 18. 416 | 18. 422 | 18. 429 | 18. 435 | 18. 442 | 18. 448 | 18. 455 | 18. 461 | 3, 170 |
| 3, 180 | 18. 461    | 18. 468 | 18. 474 | 18. 480 | 18. 487 | 18. 493 | 18. 500 | 18. 506 | 18. 513 | 18. 519 | 18. 526 | 3, 180 |
| 3, 190 | 18. 526    | 18. 532 | 18. 539 | 18. 545 | 18. 551 | 18. 558 | 18. 564 | 18. 571 | 18. 577 | 18. 584 | 18. 590 | 3, 190 |
| 3, 200 | 18. 590    | 18. 597 | 18. 603 | 18. 610 | 18. 616 | 18. 622 | 18. 629 | 18. 635 | 18. 642 | 18. 648 | 18. 655 | 3, 200 |
| 3, 210 | 18. 655    | 18. 661 | 18. 668 | 18. 674 | 18. 681 | 18. 687 | -----   | -----   | -----   | -----   | -----   | 3, 210 |
| °F     | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | °F     |

\*Based on the International Temperature Scale of 1948.



# Table 14. Platinum Versus Platinum-13-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts                                                                    | .000      | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts                                                                    |
|-------------------------------------------------------------------------------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------------------------------------------------------------------------|
| 0.000<br>.100<br>.200<br>.300<br>.400<br>.500<br>.600<br>.700<br>.800<br>.900 | Degrees F |       |       |       |       |       |       |       |       |       |       | 0.000<br>.100<br>.200<br>.300<br>.400<br>.500<br>.600<br>.700<br>.800<br>.900 |
|                                                                               | 32.0      | 35.3  | 38.7  | 42.0  | 45.2  | 48.5  | 51.7  | 54.8  | 58.0  | 61.1  | 64.2  |                                                                               |
|                                                                               | 64.2      | 67.3  | 70.3  | 73.4  | 76.4  | 79.4  | 82.4  | 85.4  | 88.4  | 91.3  | 94.2  |                                                                               |
|                                                                               | 94.2      | 97.1  | 100.1 | 102.9 | 105.8 | 108.7 | 111.5 | 114.3 | 117.1 | 119.9 | 122.7 |                                                                               |
|                                                                               | 122.7     | 125.5 | 128.2 | 131.0 | 133.7 | 136.4 | 139.2 | 141.9 | 144.6 | 147.2 | 149.9 |                                                                               |
|                                                                               | 149.9     | 152.6 | 155.2 | 157.8 | 160.5 | 163.1 | 165.7 | 168.3 | 170.9 | 173.4 | 175.9 |                                                                               |
|                                                                               | 175.9     | 178.5 | 181.1 | 183.6 | 186.1 | 188.6 | 191.1 | 193.6 | 196.1 | 198.6 | 201.0 |                                                                               |
|                                                                               | 201.0     | 203.5 | 205.9 | 208.3 | 210.8 | 213.2 | 215.6 | 218.0 | 220.4 | 222.7 | 225.1 |                                                                               |
|                                                                               | 225.1     | 227.5 | 229.8 | 232.2 | 234.5 | 236.9 | 239.2 | 241.6 | 243.9 | 246.2 | 248.5 |                                                                               |
|                                                                               | 248.5     | 250.8 | 253.1 | 255.4 | 257.7 | 259.9 | 262.2 | 264.5 | 266.7 | 269.0 | 271.2 |                                                                               |
|                                                                               | 271.2     | 273.5 | 275.7 | 277.9 | 280.2 | 282.4 | 284.6 | 286.9 | 289.1 | 291.3 | 293.5 |                                                                               |
| 1.000                                                                         | 293.5     | 295.7 | 297.9 | 300.1 | 302.3 | 304.5 | 306.7 | 308.9 | 311.1 | 313.2 | 315.4 | 1.000                                                                         |
| 1.100                                                                         | 315.4     | 317.6 | 319.7 | 321.9 | 324.1 | 326.3 | 328.4 | 330.6 | 332.7 | 334.9 | 337.0 | 1.100                                                                         |
| 1.200                                                                         | 337.0     | 339.1 | 341.3 | 343.4 | 345.5 | 347.6 | 349.7 | 351.8 | 353.9 | 356.0 | 358.1 | 1.200                                                                         |
| 1.300                                                                         | 358.1     | 360.2 | 362.3 | 364.4 | 366.4 | 368.5 | 370.6 | 372.6 | 374.7 | 376.7 | 378.8 | 1.300                                                                         |
| 1.400                                                                         | 378.8     | 380.9 | 382.9 | 385.0 | 387.0 | 389.0 | 391.1 | 393.1 | 395.1 | 397.2 | 399.2 | 1.400                                                                         |
| 1.500                                                                         | 399.2     | 401.2 | 403.2 | 405.3 | 407.3 | 409.3 | 411.3 | 413.4 | 415.4 | 417.4 | 419.4 | 1.500                                                                         |
| 1.600                                                                         | 419.4     | 421.4 | 423.4 | 425.4 | 427.4 | 429.4 | 431.3 | 433.3 | 435.3 | 437.3 | 439.3 | 1.600                                                                         |
| 1.700                                                                         | 439.3     | 441.3 | 443.3 | 445.2 | 447.2 | 449.2 | 451.1 | 453.1 | 455.1 | 457.0 | 459.0 | 1.700                                                                         |
| 1.800                                                                         | 459.0     | 460.9 | 462.9 | 464.8 | 466.8 | 468.7 | 470.7 | 472.6 | 474.6 | 476.5 | 478.4 | 1.800                                                                         |
| 1.900                                                                         | 478.4     | 480.4 | 482.3 | 484.2 | 486.1 | 488.1 | 490.0 | 491.9 | 493.9 | 495.8 | 497.7 | 1.900                                                                         |
| 2.000                                                                         | 497.7     | 499.6 | 501.5 | 503.4 | 505.3 | 507.2 | 509.1 | 511.0 | 512.9 | 514.9 | 516.8 | 2.000                                                                         |
| 2.100                                                                         | 516.8     | 518.6 | 520.5 | 522.4 | 524.3 | 526.2 | 528.1 | 529.9 | 531.8 | 533.7 | 535.6 | 2.100                                                                         |
| 2.200                                                                         | 535.6     | 537.5 | 539.4 | 541.3 | 543.1 | 545.0 | 546.9 | 548.8 | 550.6 | 552.5 | 554.4 | 2.200                                                                         |
| 2.300                                                                         | 554.4     | 556.3 | 558.1 | 560.0 | 561.8 | 563.7 | 565.5 | 567.4 | 569.2 | 571.1 | 572.9 | 2.300                                                                         |
| 2.400                                                                         | 572.9     | 574.7 | 576.6 | 578.4 | 580.3 | 582.1 | 584.0 | 585.8 | 587.6 | 589.5 | 591.3 | 2.400                                                                         |
| 2.500                                                                         | 591.3     | 593.1 | 595.0 | 596.8 | 598.6 | 600.5 | 602.3 | 604.1 | 605.9 | 607.8 | 609.6 | 2.500                                                                         |
| 2.600                                                                         | 609.6     | 611.4 | 613.2 | 615.1 | 616.9 | 618.7 | 620.5 | 622.4 | 624.2 | 626.0 | 627.8 | 2.600                                                                         |
| 2.700                                                                         | 627.8     | 629.6 | 631.4 | 633.2 | 635.0 | 636.8 | 638.6 | 640.4 | 642.2 | 644.0 | 645.8 | 2.700                                                                         |
| 2.800                                                                         | 645.8     | 647.6 | 649.4 | 651.2 | 653.0 | 654.8 | 656.6 | 658.4 | 660.2 | 662.0 | 663.8 | 2.800                                                                         |
| 2.900                                                                         | 663.8     | 665.6 | 667.4 | 669.2 | 670.9 | 672.7 | 674.5 | 676.3 | 678.1 | 679.8 | 681.6 | 2.900                                                                         |
| 3.000                                                                         | 681.6     | 683.4 | 685.2 | 686.9 | 688.7 | 690.5 | 692.3 | 694.1 | 695.8 | 697.6 | 699.4 | 3.000                                                                         |
| 3.100                                                                         | 699.4     | 701.2 | 702.9 | 704.7 | 706.5 | 708.3 | 710.0 | 711.8 | 713.6 | 715.3 | 717.1 | 3.100                                                                         |
| 3.200                                                                         | 717.1     | 718.9 | 720.6 | 722.4 | 724.2 | 725.9 | 727.7 | 729.4 | 731.2 | 732.9 | 734.7 | 3.200                                                                         |
| 3.300                                                                         | 734.7     | 736.4 | 738.2 | 740.0 | 741.7 | 743.4 | 745.2 | 747.0 | 748.7 | 750.5 | 752.2 | 3.300                                                                         |
| 3.400                                                                         | 752.2     | 753.9 | 755.7 | 757.4 | 759.2 | 760.9 | 762.7 | 764.4 | 766.1 | 767.9 | 769.6 | 3.400                                                                         |
| 3.500                                                                         | 769.6     | 771.3 | 773.1 | 774.8 | 776.5 | 778.3 | 780.0 | 781.7 | 783.4 | 785.2 | 786.9 | 3.500                                                                         |
| 3.600                                                                         | 786.9     | 788.6 | 790.3 | 792.1 | 793.8 | 795.5 | 797.2 | 798.9 | 800.6 | 802.3 | 804.0 | 3.600                                                                         |
| 3.700                                                                         | 804.0     | 805.7 | 807.4 | 809.1 | 810.8 | 812.6 | 814.3 | 816.0 | 817.7 | 819.4 | 821.1 | 3.700                                                                         |
| 3.800                                                                         | 821.1     | 822.8 | 824.5 | 826.2 | 827.9 | 829.6 | 831.3 | 833.0 | 834.7 | 836.4 | 838.2 | 3.800                                                                         |
| 3.900                                                                         | 838.2     | 839.8 | 841.5 | 843.2 | 844.9 | 846.6 | 848.3 | 850.0 | 851.7 | 853.4 | 855.2 | 3.900                                                                         |
| 4.000                                                                         | 855.2     | 856.8 | 858.5 | 860.2 | 861.9 | 863.6 | 865.4 | 867.1 | 868.8 | 870.5 | 872.2 | 4.000                                                                         |
| Millivolts                                                                    | .000      | .010  | .020  | .030  | .040  | .050  | .060  | .070  | .080  | .090  | .100  | Millivolts                                                                    |

\*Based on the International Temperature Scale of 1948.

# Table 14. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .000   | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|
| Degrees F  |        |        |        |        |        |        |        |        |        |        |        |            |
| 4.000      | 855.2  | 856.8  | 858.5  | 860.2  | 861.9  | 863.6  | 865.4  | 867.1  | 868.8  | 870.5  | 872.2  | 4.000      |
| 4.100      | 872.2  | 873.9  | 875.6  | 877.3  | 879.0  | 880.7  | 882.4  | 884.1  | 885.8  | 887.5  | 889.1  | 4.100      |
| 4.200      | 889.1  | 890.9  | 892.6  | 894.3  | 895.9  | 897.6  | 899.3  | 901.0  | 902.7  | 904.3  | 906.0  | 4.200      |
| 4.300      | 906.0  | 907.7  | 909.4  | 911.0  | 912.7  | 914.4  | 916.1  | 917.8  | 919.4  | 921.1  | 922.8  | 4.300      |
| 4.400      | 922.8  | 924.5  | 926.2  | 927.8  | 929.5  | 931.2  | 932.9  | 934.6  | 936.2  | 937.9  | 939.5  | 4.400      |
| 4.500      | 939.5  | 941.3  | 942.9  | 944.6  | 946.2  | 947.9  | 949.5  | 951.2  | 952.8  | 954.5  | 956.1  | 4.500      |
| 4.600      | 956.1  | 957.7  | 959.4  | 961.0  | 962.7  | 964.3  | 965.9  | 967.6  | 969.2  | 970.9  | 972.5  | 4.600      |
| 4.700      | 972.5  | 974.1  | 975.8  | 977.4  | 979.1  | 980.7  | 982.3  | 984.0  | 985.6  | 987.3  | 988.9  | 4.700      |
| 4.800      | 988.9  | 990.5  | 992.2  | 993.8  | 995.4  | 997.1  | 998.7  | 1000.3 | 1001.9 | 1003.6 | 1005.2 | 4.800      |
| 4.900      | 1005.2 | 1006.8 | 1008.4 | 1010.0 | 1011.7 | 1013.3 | 1014.9 | 1016.6 | 1018.2 | 1019.8 | 1021.4 | 4.900      |
| 5.000      | 1021.4 | 1023.0 | 1024.6 | 1026.3 | 1027.9 | 1029.5 | 1031.1 | 1032.7 | 1034.4 | 1036.0 | 1037.6 | 5.000      |
| 5.100      | 1037.6 | 1039.2 | 1040.8 | 1042.5 | 1044.1 | 1045.7 | 1047.3 | 1048.9 | 1050.6 | 1052.2 | 1053.8 | 5.100      |
| 5.200      | 1053.8 | 1055.4 | 1057.0 | 1058.6 | 1060.3 | 1061.9 | 1063.5 | 1065.1 | 1066.7 | 1068.3 | 1069.9 | 5.200      |
| 5.300      | 1069.9 | 1071.5 | 1073.1 | 1074.7 | 1076.3 | 1077.9 | 1079.5 | 1081.1 | 1082.7 | 1084.3 | 1085.9 | 5.300      |
| 5.400      | 1085.9 | 1087.5 | 1089.1 | 1090.7 | 1092.3 | 1093.9 | 1095.5 | 1097.1 | 1098.7 | 1100.3 | 1101.9 | 5.400      |
| 5.500      | 1101.9 | 1103.5 | 1105.1 | 1106.7 | 1108.3 | 1109.9 | 1111.5 | 1113.0 | 1114.6 | 1116.2 | 1117.8 | 5.500      |
| 5.600      | 1117.8 | 1119.4 | 1121.0 | 1122.6 | 1124.1 | 1125.7 | 1127.3 | 1128.9 | 1130.4 | 1132.0 | 1133.6 | 5.600      |
| 5.700      | 1133.6 | 1135.2 | 1136.7 | 1138.3 | 1139.9 | 1141.5 | 1143.0 | 1144.6 | 1146.2 | 1147.7 | 1149.3 | 5.700      |
| 5.800      | 1149.3 | 1150.8 | 1152.4 | 1154.0 | 1155.6 | 1157.1 | 1158.7 | 1160.2 | 1161.8 | 1163.3 | 1164.9 | 5.800      |
| 5.900      | 1164.9 | 1166.5 | 1168.0 | 1169.6 | 1171.2 | 1172.7 | 1174.3 | 1175.9 | 1177.5 | 1179.0 | 1180.6 | 5.900      |
| 6.000      | 1180.6 | 1182.2 | 1183.7 | 1185.3 | 1186.9 | 1188.4 | 1190.0 | 1191.5 | 1193.1 | 1194.7 | 1196.2 | 6.000      |
| 6.100      | 1196.2 | 1197.8 | 1199.3 | 1200.9 | 1202.5 | 1204.0 | 1205.6 | 1207.2 | 1208.7 | 1210.3 | 1211.8 | 6.100      |
| 6.200      | 1211.8 | 1213.4 | 1215.0 | 1216.5 | 1218.1 | 1219.7 | 1221.2 | 1222.8 | 1224.3 | 1225.9 | 1227.4 | 6.200      |
| 6.300      | 1227.4 | 1229.0 | 1230.5 | 1232.1 | 1233.6 | 1235.2 | 1236.7 | 1238.3 | 1239.8 | 1241.4 | 1242.9 | 6.300      |
| 6.400      | 1242.9 | 1244.4 | 1246.0 | 1247.5 | 1249.1 | 1250.6 | 1252.2 | 1253.7 | 1255.2 | 1256.8 | 1258.3 | 6.400      |
| 6.500      | 1258.3 | 1259.8 | 1261.4 | 1262.9 | 1264.4 | 1266.0 | 1267.5 | 1269.0 | 1270.5 | 1272.1 | 1273.6 | 6.500      |
| 6.600      | 1273.6 | 1275.1 | 1276.7 | 1278.2 | 1279.7 | 1281.3 | 1282.8 | 1284.3 | 1285.8 | 1287.4 | 1288.9 | 6.600      |
| 6.700      | 1288.9 | 1290.4 | 1292.0 | 1293.5 | 1295.0 | 1296.6 | 1298.1 | 1299.6 | 1301.1 | 1302.7 | 1304.2 | 6.700      |
| 6.800      | 1304.2 | 1305.7 | 1307.2 | 1308.8 | 1310.3 | 1311.8 | 1313.3 | 1314.9 | 1316.4 | 1317.9 | 1319.4 | 6.800      |
| 6.900      | 1319.4 | 1320.9 | 1322.4 | 1323.9 | 1325.5 | 1327.0 | 1328.5 | 1330.0 | 1331.5 | 1333.0 | 1334.5 | 6.900      |
| 7.000      | 1334.5 | 1336.0 | 1337.5 | 1339.0 | 1340.5 | 1342.1 | 1343.6 | 1345.1 | 1346.6 | 1348.1 | 1349.6 | 7.000      |
| 7.100      | 1349.6 | 1351.1 | 1352.6 | 1354.1 | 1355.6 | 1357.2 | 1358.7 | 1360.2 | 1361.7 | 1363.2 | 1364.7 | 7.100      |
| 7.200      | 1364.7 | 1366.2 | 1367.7 | 1369.2 | 1370.7 | 1372.2 | 1373.7 | 1375.2 | 1376.7 | 1378.2 | 1379.7 | 7.200      |
| 7.300      | 1379.7 | 1381.2 | 1382.7 | 1384.2 | 1385.7 | 1387.2 | 1388.6 | 1390.1 | 1391.6 | 1393.1 | 1394.6 | 7.300      |
| 7.400      | 1394.6 | 1396.1 | 1397.6 | 1399.1 | 1400.6 | 1402.1 | 1403.5 | 1405.0 | 1406.5 | 1408.0 | 1409.5 | 7.400      |
| 7.500      | 1409.5 | 1411.0 | 1412.5 | 1414.0 | 1415.4 | 1416.9 | 1418.4 | 1419.9 | 1421.3 | 1422.8 | 1424.3 | 7.500      |
| 7.600      | 1424.3 | 1425.8 | 1427.3 | 1428.7 | 1430.2 | 1431.7 | 1433.2 | 1434.7 | 1436.1 | 1437.6 | 1439.1 | 7.600      |
| 7.700      | 1439.1 | 1440.6 | 1442.0 | 1443.5 | 1445.0 | 1446.5 | 1447.9 | 1449.4 | 1450.9 | 1452.3 | 1453.8 | 7.700      |
| 7.800      | 1453.8 | 1455.3 | 1456.7 | 1458.2 | 1459.7 | 1461.1 | 1462.6 | 1464.0 | 1465.5 | 1466.9 | 1468.4 | 7.800      |
| 7.900      | 1468.4 | 1469.9 | 1471.3 | 1472.8 | 1474.3 | 1475.7 | 1477.2 | 1478.7 | 1480.2 | 1481.6 | 1483.1 | 7.900      |
| 8.000      | 1483.1 | 1484.6 | 1486.0 | 1487.5 | 1489.0 | 1490.4 | 1491.9 | 1493.3 | 1494.8 | 1496.2 | 1497.7 | 8.000      |
| Millivolts | .000   | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |

\*Based on the International Temperature Scale of 1948.



Table 14. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .000      | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |
|------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|
| 8.000      | Degrees F |        |        |        |        |        |        |        |        |        |        | 8.000      |
|            | 1483.1    | 1484.6 | 1486.0 | 1487.5 | 1489.0 | 1490.4 | 1491.9 | 1493.3 | 1494.8 | 1496.2 | 1497.7 |            |
| 8.100      | 1497.7    | 1499.2 | 1500.6 | 1502.1 | 1503.5 | 1505.0 | 1506.5 | 1508.0 | 1509.4 | 1510.9 | 1512.3 | 8.100      |
| 8.200      | 1512.3    | 1513.8 | 1515.2 | 1516.7 | 1518.1 | 1519.6 | 1521.0 | 1522.5 | 1523.9 | 1525.4 | 1526.8 | 8.200      |
| 8.300      | 1526.8    | 1528.3 | 1529.7 | 1531.2 | 1532.6 | 1534.1 | 1535.5 | 1537.0 | 1538.4 | 1539.9 | 1541.3 | 8.300      |
| 8.400      | 1541.3    | 1542.7 | 1544.2 | 1545.6 | 1547.1 | 1548.5 | 1550.0 | 1551.4 | 1552.8 | 1554.3 | 1555.7 | 8.400      |
| 8.500      | 1555.7    | 1557.1 | 1558.6 | 1560.0 | 1561.5 | 1562.9 | 1564.3 | 1565.8 | 1567.2 | 1568.7 | 1570.1 | 8.500      |
| 8.600      | 1570.1    | 1571.5 | 1573.0 | 1574.4 | 1575.9 | 1577.3 | 1578.7 | 1580.2 | 1581.6 | 1583.1 | 1584.5 | 8.600      |
| 8.700      | 1584.5    | 1585.9 | 1587.4 | 1588.8 | 1590.2 | 1591.7 | 1593.1 | 1594.5 | 1596.0 | 1597.4 | 1598.8 | 8.700      |
| 8.800      | 1598.8    | 1600.2 | 1601.7 | 1603.1 | 1604.5 | 1606.0 | 1607.4 | 1608.8 | 1610.2 | 1611.7 | 1613.1 | 8.800      |
| 8.900      | 1613.1    | 1614.5 | 1615.9 | 1617.4 | 1618.8 | 1620.2 | 1621.6 | 1623.1 | 1624.5 | 1625.9 | 1627.3 | 8.900      |
| 9.000      | 1627.3    | 1628.7 | 1630.1 | 1631.6 | 1633.0 | 1634.4 | 1635.8 | 1637.2 | 1638.6 | 1640.0 | 1641.4 | 9.000      |
| 9.100      | 1641.4    | 1642.9 | 1644.3 | 1645.7 | 1647.1 | 1648.5 | 1649.9 | 1651.3 | 1652.7 | 1654.1 | 1655.5 | 9.100      |
| 9.200      | 1655.5    | 1656.9 | 1658.3 | 1659.7 | 1661.1 | 1662.6 | 1664.0 | 1665.4 | 1666.8 | 1668.2 | 1669.6 | 9.200      |
| 9.300      | 1669.6    | 1671.0 | 1672.4 | 1673.8 | 1675.2 | 1676.7 | 1678.1 | 1679.5 | 1680.9 | 1682.3 | 1683.7 | 9.300      |
| 9.400      | 1683.7    | 1685.1 | 1686.5 | 1687.9 | 1689.3 | 1690.7 | 1692.1 | 1693.5 | 1694.9 | 1696.3 | 1697.7 | 9.400      |
| 9.500      | 1697.7    | 1699.1 | 1700.5 | 1701.9 | 1703.3 | 1704.7 | 1706.1 | 1707.6 | 1709.0 | 1710.4 | 1711.8 | 9.500      |
| 9.600      | 1711.8    | 1713.2 | 1714.6 | 1716.0 | 1717.4 | 1718.8 | 1720.2 | 1721.6 | 1723.0 | 1724.4 | 1725.8 | 9.600      |
| 9.700      | 1725.8    | 1727.2 | 1728.6 | 1730.0 | 1731.4 | 1732.8 | 1734.2 | 1735.6 | 1737.0 | 1738.4 | 1739.8 | 9.700      |
| 9.800      | 1739.8    | 1741.2 | 1742.6 | 1744.0 | 1745.4 | 1746.8 | 1748.2 | 1749.5 | 1750.9 | 1752.3 | 1753.7 | 9.800      |
| 9.900      | 1753.7    | 1755.1 | 1756.5 | 1757.8 | 1759.2 | 1760.6 | 1761.9 | 1763.3 | 1764.7 | 1766.0 | 1767.4 | 9.900      |
| 10.000     | 1767.4    | 1768.8 | 1770.1 | 1771.5 | 1772.9 | 1774.3 | 1775.6 | 1777.0 | 1778.4 | 1779.7 | 1781.2 | 10.000     |
| 10.100     | 1781.2    | 1782.5 | 1783.9 | 1785.2 | 1786.6 | 1788.0 | 1789.4 | 1790.7 | 1792.1 | 1793.5 | 1794.9 | 10.100     |
| 10.200     | 1794.9    | 1796.3 | 1797.6 | 1799.0 | 1800.4 | 1801.8 | 1803.1 | 1804.5 | 1805.9 | 1807.2 | 1808.6 | 10.200     |
| 10.300     | 1808.6    | 1810.0 | 1811.3 | 1812.7 | 1814.1 | 1815.5 | 1816.8 | 1818.2 | 1819.6 | 1820.9 | 1822.3 | 10.300     |
| 10.400     | 1822.3    | 1823.7 | 1825.0 | 1826.4 | 1827.8 | 1829.2 | 1830.5 | 1831.9 | 1833.3 | 1834.6 | 1836.0 | 10.400     |
| 10.500     | 1836.0    | 1837.4 | 1838.7 | 1840.1 | 1841.5 | 1842.8 | 1844.2 | 1845.5 | 1846.9 | 1848.3 | 1849.6 | 10.500     |
| 10.600     | 1849.6    | 1851.0 | 1852.3 | 1853.7 | 1855.1 | 1856.4 | 1857.8 | 1859.2 | 1860.6 | 1861.9 | 1863.3 | 10.600     |
| 10.700     | 1863.3    | 1864.7 | 1866.0 | 1867.4 | 1868.7 | 1870.1 | 1871.4 | 1872.8 | 1874.1 | 1875.5 | 1876.8 | 10.700     |
| 10.800     | 1876.8    | 1878.1 | 1879.5 | 1880.8 | 1882.2 | 1883.5 | 1884.9 | 1886.2 | 1887.5 | 1888.9 | 1890.2 | 10.800     |
| 10.900     | 1890.2    | 1891.5 | 1892.9 | 1894.2 | 1895.6 | 1896.9 | 1898.2 | 1899.6 | 1900.9 | 1902.3 | 1903.6 | 10.900     |
| 11.000     | 1903.6    | 1904.9 | 1906.3 | 1907.6 | 1909.0 | 1910.3 | 1911.6 | 1913.0 | 1914.3 | 1915.6 | 1917.0 | 11.000     |
| 11.100     | 1917.0    | 1918.3 | 1919.7 | 1921.0 | 1922.3 | 1923.6 | 1925.0 | 1926.3 | 1927.6 | 1929.0 | 1930.3 | 11.100     |
| 11.200     | 1930.3    | 1931.6 | 1933.0 | 1934.3 | 1935.6 | 1937.0 | 1938.3 | 1939.6 | 1940.9 | 1942.3 | 1943.6 | 11.200     |
| 11.300     | 1943.6    | 1944.9 | 1946.3 | 1947.6 | 1949.0 | 1950.3 | 1951.6 | 1952.9 | 1954.2 | 1955.6 | 1956.9 | 11.300     |
| 11.400     | 1956.9    | 1958.2 | 1959.5 | 1960.9 | 1962.2 | 1963.5 | 1964.8 | 1966.2 | 1967.5 | 1968.8 | 1970.1 | 11.400     |
| 11.500     | 1970.1    | 1971.4 | 1972.7 | 1974.1 | 1975.4 | 1976.7 | 1978.0 | 1979.3 | 1980.7 | 1982.0 | 1983.3 | 11.500     |
| 11.600     | 1983.3    | 1984.6 | 1986.8 | 1987.3 | 1988.6 | 1989.9 | 1991.2 | 1992.5 | 1993.9 | 1995.2 | 1996.5 | 11.600     |
| 11.700     | 1996.5    | 1997.8 | 1999.1 | 2000.5 | 2001.8 | 2003.1 | 2004.4 | 2005.7 | 2007.1 | 2008.4 | 2009.7 | 11.700     |
| 11.800     | 2009.7    | 2011.0 | 2012.3 | 2013.7 | 2015.0 | 2016.3 | 2017.6 | 2018.9 | 2020.3 | 2021.6 | 2022.9 | 11.800     |
| 11.900     | 2022.9    | 2024.2 | 2025.5 | 2026.9 | 2028.2 | 2029.5 | 2030.8 | 2032.1 | 2033.5 | 2034.8 | 2036.1 | 11.900     |
| 12.000     | 2036.1    | 2037.4 | 2038.7 | 2040.1 | 2041.4 | 2042.7 | 2044.0 | 2045.3 | 2046.7 | 2048.0 | 2049.3 | 12.000     |
| Millivolts | .000      | .010   | .020   | .030   | .040   | .050   | .060   | .070   | .080   | .090   | .100   | Millivolts |

\*Based on the International Temperature Scale of 1948.



# Table 14. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------|
| Degrees F  |         |         |         |         |         |         |         |         |         |         |         |            |
| 12. 000    | 2036. 1 | 2037. 4 | 2038. 7 | 2040. 1 | 2041. 4 | 2042. 7 | 2044. 0 | 2045. 3 | 2046. 7 | 2048. 0 | 2049. 3 | 12. 000    |
| 12. 100    | 2049. 3 | 2050. 6 | 2051. 9 | 2053. 2 | 2054. 5 | 2055. 8 | 2057. 2 | 2058. 5 | 2059. 8 | 2061. 1 | 2062. 4 | 12. 100    |
| 12. 200    | 2062. 4 | 2063. 7 | 2065. 0 | 2066. 3 | 2067. 6 | 2069. 0 | 2070. 3 | 2071. 6 | 2072. 9 | 2074. 2 | 2075. 5 | 12. 200    |
| 12. 300    | 2075. 5 | 2076. 8 | 2078. 1 | 2079. 4 | 2080. 7 | 2082. 0 | 2083. 3 | 2084. 6 | 2085. 9 | 2087. 2 | 2088. 6 | 12. 300    |
| 12. 400    | 2088. 6 | 2089. 8 | 2091. 1 | 2092. 4 | 2093. 7 | 2095. 0 | 2096. 3 | 2097. 7 | 2099. 0 | 2100. 3 | 2101. 6 | 12. 400    |
| 12. 500    | 2101. 6 | 2102. 9 | 2104. 2 | 2105. 5 | 2106. 8 | 2108. 2 | 2109. 5 | 2110. 8 | 2112. 1 | 2113. 4 | 2114. 7 | 12. 500    |
| 12. 600    | 2114. 7 | 2116. 0 | 2117. 3 | 2118. 6 | 2119. 9 | 2121. 2 | 2122. 5 | 2123. 8 | 2125. 1 | 2126. 4 | 2127. 7 | 12. 600    |
| 12. 700    | 2127. 7 | 2129. 0 | 2130. 3 | 2131. 6 | 2132. 9 | 2134. 2 | 2135. 5 | 2136. 8 | 2138. 1 | 2139. 4 | 2140. 7 | 12. 700    |
| 12. 800    | 2140. 7 | 2142. 0 | 2143. 3 | 2144. 6 | 2145. 9 | 2147. 2 | 2148. 5 | 2149. 9 | 2151. 2 | 2152. 5 | 2153. 8 | 12. 800    |
| 12. 900    | 2153. 8 | 2155. 1 | 2156. 4 | 2157. 7 | 2159. 0 | 2160. 3 | 2161. 6 | 2162. 9 | 2164. 2 | 2165. 5 | 2166. 8 | 12. 900    |
| 13. 000    | 2166. 8 | 2168. 1 | 2169. 4 | 2170. 7 | 2172. 0 | 2173. 3 | 2174. 6 | 2175. 9 | 2177. 2 | 2178. 5 | 2179. 8 | 13. 000    |
| 13. 100    | 2179. 8 | 2181. 1 | 2182. 4 | 2183. 7 | 2185. 0 | 2186. 3 | 2187. 7 | 2189. 0 | 2190. 3 | 2191. 6 | 2192. 9 | 13. 100    |
| 13. 200    | 2192. 9 | 2194. 2 | 2195. 5 | 2196. 8 | 2198. 1 | 2199. 4 | 2200. 7 | 2202. 0 | 2203. 3 | 2204. 6 | 2205. 9 | 13. 200    |
| 13. 300    | 2205. 9 | 2207. 2 | 2208. 5 | 2209. 8 | 2211. 1 | 2212. 4 | 2213. 6 | 2214. 9 | 2216. 2 | 2217. 5 | 2218. 8 | 13. 300    |
| 13. 400    | 2218. 8 | 2220. 1 | 2221. 4 | 2222. 7 | 2224. 0 | 2225. 3 | 2226. 6 | 2227. 9 | 2229. 2 | 2230. 5 | 2231. 8 | 13. 400    |
| 13. 500    | 2231. 8 | 2233. 1 | 2234. 4 | 2235. 7 | 2237. 0 | 2238. 3 | 2239. 5 | 2240. 8 | 2242. 1 | 2243. 4 | 2244. 7 | 13. 500    |
| 13. 600    | 2244. 7 | 2246. 0 | 2247. 3 | 2248. 6 | 2249. 9 | 2251. 2 | 2252. 5 | 2253. 8 | 2255. 1 | 2256. 4 | 2257. 7 | 13. 600    |
| 13. 700    | 2257. 7 | 2259. 0 | 2260. 3 | 2261. 6 | 2262. 9 | 2264. 2 | 2265. 5 | 2266. 8 | 2268. 1 | 2269. 4 | 2270. 7 | 13. 700    |
| 13. 800    | 2270. 7 | 2272. 0 | 2273. 3 | 2274. 6 | 2275. 9 | 2277. 2 | 2278. 4 | 2279. 7 | 2281. 0 | 2282. 3 | 2283. 6 | 13. 800    |
| 13. 900    | 2283. 6 | 2284. 9 | 2286. 2 | 2287. 5 | 2288. 8 | 2290. 1 | 2291. 4 | 2292. 7 | 2294. 0 | 2295. 3 | 2296. 6 | 13. 900    |
| 14. 000    | 2296. 6 | 2297. 9 | 2299. 2 | 2300. 5 | 2301. 8 | 2303. 0 | 2304. 3 | 2305. 6 | 2306. 9 | 2308. 2 | 2309. 5 | 14. 000    |
| 14. 100    | 2309. 5 | 2310. 8 | 2312. 1 | 2313. 4 | 2314. 7 | 2316. 0 | 2317. 3 | 2318. 6 | 2319. 9 | 2321. 2 | 2322. 5 | 14. 100    |
| 14. 200    | 2322. 5 | 2323. 8 | 2325. 1 | 2326. 4 | 2327. 7 | 2329. 0 | 2330. 3 | 2331. 6 | 2332. 9 | 2334. 2 | 2335. 5 | 14. 200    |
| 14. 300    | 2335. 5 | 2336. 8 | 2338. 1 | 2339. 4 | 2340. 7 | 2342. 0 | 2343. 2 | 2344. 5 | 2345. 8 | 2347. 1 | 2348. 4 | 14. 300    |
| 14. 400    | 2348. 4 | 2349. 7 | 2351. 0 | 2352. 3 | 2353. 6 | 2354. 9 | 2356. 1 | 2357. 4 | 2358. 7 | 2360. 0 | 2361. 3 | 14. 400    |
| 14. 500    | 2361. 3 | 2362. 6 | 2363. 9 | 2365. 2 | 2366. 5 | 2367. 8 | 2369. 0 | 2370. 3 | 2371. 6 | 2372. 9 | 2374. 2 | 14. 500    |
| 14. 600    | 2374. 2 | 2375. 5 | 2376. 8 | 2378. 1 | 2379. 4 | 2380. 7 | 2382. 0 | 2383. 3 | 2384. 6 | 2385. 9 | 2387. 2 | 14. 600    |
| 14. 700    | 2387. 2 | 2388. 5 | 2389. 8 | 2391. 1 | 2392. 4 | 2393. 7 | 2395. 0 | 2396. 3 | 2397. 6 | 2398. 9 | 2400. 2 | 14. 700    |
| 14. 800    | 2400. 2 | 2401. 5 | 2402. 8 | 2404. 1 | 2405. 3 | 2406. 7 | 2408. 0 | 2409. 3 | 2410. 6 | 2411. 9 | 2413. 2 | 14. 800    |
| 14. 900    | 2413. 2 | 2414. 5 | 2415. 8 | 2417. 1 | 2418. 4 | 2419. 7 | 2421. 0 | 2422. 3 | 2423. 6 | 2424. 9 | 2426. 2 | 14. 900    |
| 15. 000    | 2426. 2 | 2427. 5 | 2428. 8 | 2430. 1 | 2431. 4 | 2432. 7 | 2433. 9 | 2435. 2 | 2436. 5 | 2437. 8 | 2439. 1 | 15. 000    |
| 15. 100    | 2439. 1 | 2440. 4 | 2441. 7 | 2443. 0 | 2444. 3 | 2445. 6 | 2446. 9 | 2448. 2 | 2449. 5 | 2450. 8 | 2452. 1 | 15. 100    |
| 15. 200    | 2452. 1 | 2453. 4 | 2454. 7 | 2456. 0 | 2457. 3 | 2458. 6 | 2459. 9 | 2461. 2 | 2462. 5 | 2463. 8 | 2465. 1 | 15. 200    |
| 15. 300    | 2465. 1 | 2466. 4 | 2467. 7 | 2469. 0 | 2470. 3 | 2471. 6 | 2472. 8 | 2474. 1 | 2475. 4 | 2476. 7 | 2478. 0 | 15. 300    |
| 15. 400    | 2478. 0 | 2479. 3 | 2480. 6 | 2481. 9 | 2483. 2 | 2484. 5 | 2485. 8 | 2487. 1 | 2488. 4 | 2489. 7 | 2491. 0 | 15. 400    |
| 15. 500    | 2491. 0 | 2492. 3 | 2493. 6 | 2494. 9 | 2496. 2 | 2497. 6 | 2498. 9 | 2500. 2 | 2501. 5 | 2502. 8 | 2504. 1 | 15. 500    |
| 15. 600    | 2504. 1 | 2505. 4 | 2506. 7 | 2508. 0 | 2509. 3 | 2510. 6 | 2511. 9 | 2513. 2 | 2514. 5 | 2515. 8 | 2517. 1 | 15. 600    |
| 15. 700    | 2517. 1 | 2518. 4 | 2519. 7 | 2521. 0 | 2522. 3 | 2523. 6 | 2524. 8 | 2526. 1 | 2527. 4 | 2528. 7 | 2530. 0 | 15. 700    |
| 15. 800    | 2530. 0 | 2531. 3 | 2532. 6 | 2533. 9 | 2535. 2 | 2536. 5 | 2537. 8 | 2539. 1 | 2540. 4 | 2541. 7 | 2543. 0 | 15. 800    |
| 15. 900    | 2543. 0 | 2544. 3 | 2545. 6 | 2546. 9 | 2548. 2 | 2549. 5 | 2550. 8 | 2552. 1 | 2553. 4 | 2554. 7 | 2556. 0 | 15. 900    |
| 16. 000    | 2556. 0 | 2557. 3 | 2558. 6 | 2559. 9 | 2561. 2 | 2562. 5 | 2563. 7 | 2565. 0 | 2566. 3 | 2567. 6 | 2568. 9 | 16. 000    |
| Millivolts | .000    | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |

\*Based on the International Temperature Scale of 1948.

Table 14. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .000      | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |
|------------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------|
|            | Degrees F |         |         |         |         |         |         |         |         |         |         |            |
| 16. 000    | 2556. 0   | 2557. 3 | 2558. 6 | 2559. 9 | 2561. 2 | 2562. 5 | 2563. 7 | 2565. 0 | 2566. 3 | 2567. 6 | 2568. 9 | 16. 000    |
| 16. 100    | 2568. 9   | 2570. 2 | 2571. 5 | 2572. 8 | 2574. 1 | 2575. 4 | 2576. 7 | 2578. 0 | 2579. 3 | 2580. 6 | 2581. 9 | 16. 100    |
| 16. 200    | 2581. 9   | 2583. 2 | 2584. 5 | 2585. 8 | 2587. 1 | 2588. 4 | 2589. 6 | 2590. 9 | 2592. 2 | 2593. 5 | 2594. 8 | 16. 200    |
| 16. 300    | 2594. 8   | 2596. 1 | 2597. 4 | 2598. 7 | 2600. 0 | 2601. 3 | 2602. 6 | 2603. 9 | 2605. 2 | 2606. 5 | 2607. 8 | 16. 300    |
| 16. 400    | 2607. 8   | 2609. 1 | 2610. 4 | 2611. 7 | 2613. 0 | 2614. 3 | 2615. 6 | 2616. 9 | 2618. 2 | 2619. 5 | 2620. 8 | 16. 400    |
| 16. 500    | 2620. 8   | 2622. 1 | 2623. 4 | 2624. 7 | 2626. 0 | 2627. 3 | 2628. 5 | 2629. 8 | 2631. 1 | 2632. 4 | 2633. 7 | 16. 500    |
| 16. 600    | 2633. 7   | 2635. 0 | 2636. 3 | 2637. 6 | 2638. 9 | 2640. 2 | 2641. 5 | 2642. 8 | 2644. 1 | 2645. 4 | 2646. 7 | 16. 600    |
| 16. 700    | 2646. 7   | 2648. 0 | 2649. 3 | 2650. 6 | 2651. 9 | 2653. 2 | 2654. 4 | 2655. 7 | 2657. 0 | 2658. 3 | 2659. 6 | 16. 700    |
| 16. 800    | 2659. 6   | 2660. 9 | 2662. 2 | 2663. 5 | 2664. 8 | 2666. 1 | 2667. 4 | 2668. 7 | 2670. 0 | 2671. 3 | 2672. 6 | 16. 800    |
| 16. 900    | 2672. 6   | 2673. 9 | 2675. 2 | 2676. 5 | 2677. 8 | 2679. 2 | 2680. 5 | 2681. 8 | 2683. 1 | 2684. 4 | 2685. 7 | 16. 900    |
| 17. 000    | 2685. 7   | 2687. 0 | 2688. 3 | 2689. 6 | 2690. 9 | 2692. 2 | 2693. 5 | 2694. 8 | 2696. 1 | 2697. 4 | 2698. 8 | 17. 000    |
| 17. 100    | 2698. 8   | 2700. 0 | 2701. 3 | 2702. 6 | 2703. 9 | 2705. 3 | 2706. 6 | 2707. 9 | 2709. 2 | 2710. 5 | 2711. 8 | 17. 100    |
| 17. 200    | 2711. 8   | 2713. 1 | 2714. 4 | 2715. 7 | 2717. 0 | 2718. 3 | 2719. 6 | 2720. 9 | 2722. 2 | 2723. 5 | 2724. 9 | 17. 200    |
| 17. 300    | 2724. 9   | 2726. 1 | 2727. 4 | 2728. 7 | 2730. 0 | 2731. 4 | 2732. 7 | 2734. 0 | 2735. 3 | 2736. 6 | 2737. 9 | 17. 300    |
| 17. 400    | 2737. 9   | 2739. 2 | 2740. 5 | 2741. 8 | 2743. 1 | 2744. 4 | 2745. 7 | 2747. 0 | 2748. 3 | 2749. 6 | 2751. 0 | 17. 400    |
| 17. 500    | 2751. 0   | 2752. 2 | 2753. 5 | 2754. 8 | 2756. 1 | 2757. 5 | 2758. 8 | 2760. 1 | 2761. 4 | 2762. 7 | 2764. 0 | 17. 500    |
| 17. 600    | 2764. 0   | 2765. 3 | 2766. 6 | 2767. 9 | 2769. 2 | 2770. 5 | 2771. 8 | 2773. 1 | 2774. 4 | 2775. 7 | 2777. 0 | 17. 600    |
| 17. 700    | 2777. 0   | 2778. 3 | 2779. 6 | 2780. 9 | 2782. 2 | 2783. 6 | 2784. 9 | 2786. 2 | 2787. 5 | 2788. 8 | 2790. 1 | 17. 700    |
| 17. 800    | 2790. 1   | 2791. 4 | 2792. 7 | 2794. 1 | 2795. 4 | 2796. 7 | 2798. 0 | 2799. 3 | 2800. 7 | 2802. 0 | 2803. 3 | 17. 800    |
| 17. 900    | 2803. 3   | 2804. 6 | 2805. 9 | 2807. 2 | 2808. 5 | 2809. 9 | 2811. 2 | 2812. 5 | 2813. 8 | 2815. 1 | 2816. 4 | 17. 900    |
| 18. 000    | 2816. 4   | 2817. 7 | 2819. 0 | 2820. 4 | 2821. 7 | 2823. 0 | 2824. 3 | 2825. 6 | 2827. 0 | 2828. 3 | 2829. 6 | 18. 000    |
| 18. 100    | 2829. 6   | 2830. 9 | 2832. 2 | 2833. 5 | 2834. 8 | 2836. 2 | 2837. 5 | 2838. 8 | 2840. 1 | 2841. 4 | 2842. 7 | 18. 100    |
| 18. 200    | 2842. 7   | 2844. 0 | 2845. 3 | 2846. 6 | 2847. 9 | 2849. 3 | 2850. 6 | 2851. 9 | 2853. 2 | 2854. 5 | 2855. 8 | 18. 200    |
| 18. 300    | 2855. 8   | 2857. 1 | 2858. 5 | 2859. 8 | 2861. 1 | 2862. 4 | 2863. 7 | 2865. 0 | 2866. 4 | 2867. 7 | 2869. 0 | 18. 300    |
| 18. 400    | 2869. 0   | 2870. 3 | 2871. 6 | 2872. 9 | 2874. 2 | 2875. 6 | 2876. 9 | 2878. 2 | 2879. 5 | 2880. 8 | 2882. 1 | 18. 400    |
| 18. 500    | 2882. 1   | 2883. 4 | 2884. 7 | 2886. 1 | 2887. 4 | 2888. 7 | 2890. 0 | 2891. 3 | 2892. 7 | 2894. 0 | 2895. 3 | 18. 500    |
| 18. 600    | 2895. 3   | 2896. 6 | 2897. 9 | 2899. 2 | 2900. 5 | 2901. 9 | 2903. 2 | 2904. 5 | 2905. 8 | 2907. 1 | 2908. 4 | 18. 600    |
| 18. 700    | 2908. 4   | 2909. 7 | 2911. 0 | 2912. 4 | 2913. 7 | 2915. 0 | 2916. 3 | 2917. 6 | 2918. 9 | 2920. 2 | 2921. 5 | 18. 700    |
| 18. 800    | 2921. 5   | 2922. 8 | 2924. 1 | 2925. 5 | 2926. 8 | 2928. 1 | 2929. 4 | 2930. 7 | 2932. 1 | 2933. 4 | 2934. 7 | 18. 800    |
| 18. 900    | 2934. 7   | 2936. 0 | 2937. 3 | 2938. 7 | 2940. 0 | 2941. 3 | 2942. 6 | 2943. 9 | 2945. 3 | 2946. 6 | 2947. 9 | 18. 900    |
| 19. 000    | 2947. 9   | 2949. 2 | 2950. 5 | 2951. 9 | 2953. 2 | 2954. 5 | 2955. 8 | 2957. 1 | 2958. 5 | 2959. 8 | 2961. 1 | 19. 000    |
| 19. 100    | 2961. 1   | 2962. 4 | 2963. 7 | 2965. 1 | 2966. 4 | 2967. 7 | 2969. 0 | 2970. 3 | 2971. 7 | 2973. 0 | 2974. 3 | 19. 100    |
| 19. 200    | 2974. 3   | 2975. 6 | 2977. 0 | 2978. 3 | 2979. 6 | 2981. 0 | 2982. 3 | 2983. 6 | 2984. 9 | 2986. 3 | 2987. 6 | 19. 200    |
| 19. 300    | 2987. 6   | 2988. 9 | 2990. 2 | 2991. 6 | 2992. 9 | 2994. 2 | 2995. 5 | 2996. 8 | 2998. 2 | 2999. 5 | 3000. 8 | 19. 300    |
| 19. 400    | 3000. 8   | 3002. 1 | 3003. 4 | 3004. 8 | 3006. 1 | 3007. 4 | 3008. 7 | 3010. 0 | 3011. 4 | 3012. 7 | 3014. 0 | 19. 400    |
| 19. 500    | 3014. 0   | 3015. 3 | 3016. 6 | 3018. 0 | 3019. 3 | 3020. 6 | 3021. 9 | 3023. 2 | 3024. 6 | 3025. 9 | 3027. 2 | 19. 500    |
| 19. 600    | 3027. 2   | 3028. 5 | 3029. 8 | 3031. 2 | 3032. 5 | 3033. 8 | 3035. 1 | 3036. 4 | 3037. 8 | 3039. 1 | 3040. 4 | 19. 600    |
| 19. 700    | 3040. 4   | 3041. 7 | 3043. 0 | 3044. 4 | 3045. 7 | 3047. 0 | 3048. 3 | 3049. 6 | 3051. 0 | 3052. 3 | 3053. 6 | 19. 700    |
| 19. 800    | 3053. 6   | 3054. 9 | 3056. 2 | 3057. 6 | 3058. 9 | 3060. 2 | 3061. 5 | 3062. 8 | 3064. 2 | 3065. 5 | 3066. 8 | 19. 800    |
| 19. 900    | 3066. 8   | 3068. 1 | 3069. 5 | 3070. 8 | 3072. 1 | 3073. 5 | 3074. 8 | 3076. 1 | 3077. 4 | 3078. 8 | 3080. 1 | 19. 900    |
| 20. 000    | 3080. 1   | 3081. 4 | 3082. 8 | 3084. 1 | 3085. 4 | 3086. 8 | 3088. 1 | 3089. 4 | 3090. 7 | 3092. 0 | 3093. 4 | 20. 000    |
| Millivolts | .000      | .010    | .020    | .030    | .040    | .050    | .060    | .070    | .080    | .090    | .100    | Millivolts |

\*Based on the International Temperature Scale of 1948.



# Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F |
|-----|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|     | Millivolts |       |       |       |       |       |       |       |       |       |       |     |
| 30  | -----      | ----- | 0.000 | 0.003 | 0.006 | 0.009 | 0.012 | 0.015 | 0.018 | 0.021 | 0.024 | 30  |
| 40  | 0.024      | 0.027 | .030  | .033  | .036  | .039  | .042  | .045  | .048  | .052  | .055  | 40  |
| 50  | .055       | .058  | .061  | .064  | .068  | .071  | .074  | .077  | .080  | .083  | .086  | 50  |
| 60  | .086       | .090  | .093  | .096  | .099  | .103  | .106  | .109  | .112  | .116  | .119  | 60  |
| 70  | .119       | .122  | .126  | .129  | .132  | .135  | .139  | .142  | .145  | .149  | .152  | 70  |
| 80  | .152       | .155  | .159  | .162  | .165  | .169  | .172  | .175  | .179  | .182  | .186  | 80  |
| 90  | .186       | .189  | .192  | .196  | .199  | .203  | .206  | .210  | .213  | .217  | .220  | 90  |
| 100 | .220       | .224  | .227  | .230  | .234  | .237  | .241  | .244  | .248  | .251  | .255  | 100 |
| 110 | .255       | .258  | .262  | .265  | .269  | .272  | .276  | .280  | .284  | .287  | .291  | 110 |
| 120 | .291       | .294  | .298  | .301  | .305  | .308  | .312  | .316  | .319  | .323  | .327  | 120 |
| 130 | .327       | .330  | .334  | .337  | .341  | .345  | .349  | .352  | .356  | .359  | .363  | 130 |
| 140 | .363       | .367  | .370  | .374  | .378  | .381  | .385  | .389  | .393  | .397  | .400  | 140 |
| 150 | .400       | .404  | .408  | .411  | .415  | .419  | .423  | .427  | .431  | .435  | .438  | 150 |
| 160 | .438       | .442  | .446  | .450  | .453  | .457  | .461  | .465  | .469  | .473  | .476  | 160 |
| 170 | .476       | .480  | .484  | .488  | .492  | .496  | .500  | .504  | .508  | .512  | .516  | 170 |
| 180 | .516       | .520  | .524  | .528  | .532  | .536  | .540  | .544  | .548  | .552  | .556  | 180 |
| 190 | .556       | .560  | .564  | .568  | .572  | .576  | .580  | .584  | .588  | .592  | .596  | 190 |
| 200 | .596       | .600  | .604  | .608  | .612  | .616  | .620  | .625  | .629  | .633  | .637  | 200 |
| 210 | .637       | .641  | .645  | .649  | .653  | .657  | .662  | .666  | .670  | .674  | .678  | 210 |
| 220 | .678       | .683  | .687  | .691  | .695  | .700  | .704  | .708  | .712  | .716  | .721  | 220 |
| 230 | .721       | .725  | .729  | .734  | .738  | .742  | .746  | .750  | .755  | .759  | .763  | 230 |
| 240 | .763       | .767  | .772  | .776  | .780  | .785  | .789  | .793  | .798  | .802  | .807  | 240 |
| 250 | .807       | .811  | .815  | .820  | .824  | .828  | .833  | .837  | .842  | .846  | .850  | 250 |
| 260 | .850       | .855  | .859  | .863  | .868  | .872  | .877  | .881  | .886  | .890  | .894  | 260 |
| 270 | .894       | .899  | .904  | .908  | .912  | .917  | .921  | .926  | .930  | .935  | .939  | 270 |
| 280 | .939       | .944  | .948  | .953  | .957  | .962  | .966  | .971  | .975  | .980  | .984  | 280 |
| 290 | .984       | .989  | .993  | .998  | 1.002 | 1.007 | 1.011 | 1.016 | 1.020 | 1.025 | 1.030 | 290 |
| 300 | 1.030      | 1.034 | 1.039 | 1.043 | 1.048 | 1.052 | 1.057 | 1.061 | 1.066 | 1.071 | 1.075 | 300 |
| 310 | 1.075      | 1.080 | 1.084 | 1.089 | 1.094 | 1.098 | 1.103 | 1.107 | 1.112 | 1.117 | 1.121 | 310 |
| 320 | 1.121      | 1.126 | 1.130 | 1.135 | 1.140 | 1.144 | 1.149 | 1.153 | 1.158 | 1.163 | 1.167 | 320 |
| 330 | 1.167      | 1.172 | 1.176 | 1.181 | 1.186 | 1.191 | 1.195 | 1.200 | 1.205 | 1.210 | 1.214 | 330 |
| 340 | 1.214      | 1.219 | 1.223 | 1.228 | 1.233 | 1.238 | 1.242 | 1.247 | 1.252 | 1.257 | 1.261 | 340 |
| 350 | 1.261      | 1.266 | 1.271 | 1.276 | 1.280 | 1.285 | 1.290 | 1.295 | 1.300 | 1.304 | 1.309 | 350 |
| 360 | 1.309      | 1.314 | 1.319 | 1.323 | 1.328 | 1.333 | 1.338 | 1.343 | 1.348 | 1.352 | 1.357 | 360 |
| 370 | 1.357      | 1.362 | 1.367 | 1.372 | 1.377 | 1.381 | 1.386 | 1.391 | 1.396 | 1.401 | 1.406 | 370 |
| 380 | 1.406      | 1.410 | 1.415 | 1.420 | 1.425 | 1.430 | 1.435 | 1.440 | 1.445 | 1.450 | 1.455 | 380 |
| 390 | 1.455      | 1.460 | 1.465 | 1.470 | 1.475 | 1.480 | 1.484 | 1.489 | 1.494 | 1.499 | 1.504 | 390 |
| 400 | 1.504      | 1.509 | 1.514 | 1.519 | 1.524 | 1.529 | 1.533 | 1.538 | 1.543 | 1.548 | 1.553 | 400 |
| ° F | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F |

\*Based on the International Temperature Scale of 1948.



**Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----|
| Millivolts |        |        |        |        |        |        |        |        |        |        |        |     |
| 400        | 1. 504 | 1. 509 | 1. 514 | 1. 519 | 1. 524 | 1. 529 | 1. 533 | 1. 538 | 1. 543 | 1. 548 | 1. 553 | 400 |
| 410        | 1. 553 | 1. 558 | 1. 563 | 1. 568 | 1. 573 | 1. 578 | 1. 583 | 1. 588 | 1. 593 | 1. 598 | 1. 603 | 410 |
| 420        | 1. 603 | 1. 608 | 1. 613 | 1. 618 | 1. 623 | 1. 628 | 1. 633 | 1. 638 | 1. 643 | 1. 648 | 1. 653 | 420 |
| 430        | 1. 653 | 1. 658 | 1. 663 | 1. 668 | 1. 673 | 1. 678 | 1. 683 | 1. 688 | 1. 693 | 1. 698 | 1. 703 | 430 |
| 440        | 1. 703 | 1. 708 | 1. 713 | 1. 719 | 1. 724 | 1. 729 | 1. 734 | 1. 739 | 1. 744 | 1. 749 | 1. 754 | 440 |
| 450        | 1. 754 | 1. 759 | 1. 764 | 1. 769 | 1. 774 | 1. 779 | 1. 785 | 1. 790 | 1. 795 | 1. 800 | 1. 805 | 450 |
| 460        | 1. 805 | 1. 811 | 1. 816 | 1. 821 | 1. 826 | 1. 831 | 1. 836 | 1. 841 | 1. 846 | 1. 851 | 1. 856 | 460 |
| 470        | 1. 856 | 1. 862 | 1. 867 | 1. 872 | 1. 877 | 1. 882 | 1. 887 | 1. 892 | 1. 898 | 1. 903 | 1. 908 | 470 |
| 480        | 1. 908 | 1. 913 | 1. 918 | 1. 924 | 1. 929 | 1. 934 | 1. 939 | 1. 944 | 1. 950 | 1. 955 | 1. 960 | 480 |
| 490        | 1. 960 | 1. 965 | 1. 970 | 1. 976 | 1. 981 | 1. 986 | 1. 991 | 1. 996 | 2. 002 | 2. 007 | 2. 012 | 490 |
| 500        | 2. 012 | 2. 017 | 2. 023 | 2. 028 | 2. 033 | 2. 038 | 2. 044 | 2. 049 | 2. 054 | 2. 059 | 2. 065 | 500 |
| 510        | 2. 065 | 2. 070 | 2. 075 | 2. 081 | 2. 086 | 2. 091 | 2. 096 | 2. 101 | 2. 107 | 2. 112 | 2. 117 | 510 |
| 520        | 2. 117 | 2. 123 | 2. 128 | 2. 133 | 2. 139 | 2. 144 | 2. 149 | 2. 154 | 2. 160 | 2. 165 | 2. 170 | 520 |
| 530        | 2. 170 | 2. 176 | 2. 181 | 2. 186 | 2. 192 | 2. 197 | 2. 202 | 2. 207 | 2. 213 | 2. 218 | 2. 223 | 530 |
| 540        | 2. 223 | 2. 229 | 2. 234 | 2. 239 | 2. 245 | 2. 250 | 2. 255 | 2. 261 | 2. 266 | 2. 271 | 2. 277 | 540 |
| 550        | 2. 277 | 2. 282 | 2. 287 | 2. 293 | 2. 298 | 2. 303 | 2. 308 | 2. 314 | 2. 319 | 2. 325 | 2. 330 | 550 |
| 560        | 2. 330 | 2. 335 | 2. 341 | 2. 346 | 2. 352 | 2. 357 | 2. 363 | 2. 368 | 2. 373 | 2. 379 | 2. 384 | 560 |
| 570        | 2. 384 | 2. 389 | 2. 395 | 2. 401 | 2. 406 | 2. 412 | 2. 417 | 2. 423 | 2. 428 | 2. 433 | 2. 438 | 570 |
| 580        | 2. 438 | 2. 444 | 2. 449 | 2. 455 | 2. 460 | 2. 466 | 2. 471 | 2. 477 | 2. 482 | 2. 487 | 2. 493 | 580 |
| 590        | 2. 493 | 2. 498 | 2. 504 | 2. 509 | 2. 515 | 2. 520 | 2. 526 | 2. 531 | 2. 537 | 2. 542 | 2. 547 | 590 |
| 600        | 2. 547 | 2. 553 | 2. 558 | 2. 564 | 2. 569 | 2. 575 | 2. 580 | 2. 586 | 2. 591 | 2. 597 | 2. 602 | 600 |
| 610        | 2. 602 | 2. 608 | 2. 613 | 2. 619 | 2. 624 | 2. 630 | 2. 635 | 2. 641 | 2. 646 | 2. 652 | 2. 657 | 610 |
| 620        | 2. 657 | 2. 663 | 2. 668 | 2. 674 | 2. 679 | 2. 685 | 2. 690 | 2. 696 | 2. 701 | 2. 707 | 2. 712 | 620 |
| 630        | 2. 712 | 2. 718 | 2. 723 | 2. 729 | 2. 734 | 2. 740 | 2. 746 | 2. 751 | 2. 757 | 2. 762 | 2. 768 | 630 |
| 640        | 2. 768 | 2. 773 | 2. 779 | 2. 784 | 2. 790 | 2. 796 | 2. 801 | 2. 807 | 2. 812 | 2. 818 | 2. 823 | 640 |
| 650        | 2. 823 | 2. 829 | 2. 834 | 2. 840 | 2. 846 | 2. 851 | 2. 857 | 2. 862 | 2. 868 | 2. 873 | 2. 879 | 650 |
| 660        | 2. 879 | 2. 884 | 2. 890 | 2. 896 | 2. 901 | 2. 907 | 2. 912 | 2. 918 | 2. 923 | 2. 929 | 2. 935 | 660 |
| 670        | 2. 935 | 2. 940 | 2. 946 | 2. 952 | 2. 957 | 2. 963 | 2. 968 | 2. 974 | 2. 979 | 2. 985 | 2. 991 | 670 |
| 680        | 2. 991 | 2. 997 | 3. 002 | 3. 008 | 3. 013 | 3. 019 | 3. 024 | 3. 030 | 3. 036 | 3. 041 | 3. 047 | 680 |
| 690        | 3. 047 | 3. 053 | 3. 058 | 3. 064 | 3. 069 | 3. 075 | 3. 081 | 3. 087 | 3. 092 | 3. 098 | 3. 103 | 690 |
| 700        | 3. 103 | 3. 109 | 3. 115 | 3. 120 | 3. 126 | 3. 132 | 3. 137 | 3. 143 | 3. 148 | 3. 154 | 3. 160 | 700 |
| 710        | 3. 160 | 3. 166 | 3. 171 | 3. 177 | 3. 182 | 3. 188 | 3. 194 | 3. 199 | 3. 205 | 3. 211 | 3. 217 | 710 |
| 720        | 3. 217 | 3. 222 | 3. 228 | 3. 234 | 3. 239 | 3. 245 | 3. 251 | 3. 256 | 3. 262 | 3. 268 | 3. 273 | 720 |
| 730        | 3. 273 | 3. 279 | 3. 285 | 3. 291 | 3. 296 | 3. 302 | 3. 308 | 3. 313 | 3. 319 | 3. 325 | 3. 330 | 730 |
| 740        | 3. 330 | 3. 336 | 3. 342 | 3. 348 | 3. 353 | 3. 359 | 3. 365 | 3. 370 | 3. 376 | 3. 382 | 3. 387 | 740 |
| 750        | 3. 387 | 3. 393 | 3. 399 | 3. 405 | 3. 411 | 3. 416 | 3. 422 | 3. 428 | 3. 433 | 3. 439 | 3. 445 | 750 |
| 760        | 3. 445 | 3. 451 | 3. 456 | 3. 462 | 3. 468 | 3. 473 | 3. 479 | 3. 485 | 3. 491 | 3. 497 | 3. 502 | 760 |
| 770        | 3. 502 | 3. 508 | 3. 514 | 3. 519 | 3. 525 | 3. 531 | 3. 537 | 3. 543 | 3. 549 | 3. 554 | 3. 560 | 770 |
| 780        | 3. 560 | 3. 566 | 3. 572 | 3. 577 | 3. 583 | 3. 589 | 3. 595 | 3. 601 | 3. 607 | 3. 612 | 3. 618 | 780 |
| 790        | 3. 618 | 3. 624 | 3. 630 | 3. 635 | 3. 641 | 3. 647 | 3. 653 | 3. 659 | 3. 665 | 3. 671 | 3. 677 | 790 |
| 800        | 3. 677 | 3. 682 | 3. 688 | 3. 694 | 3. 700 | 3. 706 | 3. 712 | 3. 718 | 3. 723 | 3. 729 | 3. 735 | 800 |
| ° F        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F |

\*Based on the International Temperature Scale of 1948.

# Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F    |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Millivolts |        |        |        |        |        |        |        |        |        |        |        |        |
| 800        | 3. 677 | 3. 682 | 3. 688 | 3. 694 | 3. 700 | 3. 706 | 3. 712 | 3. 718 | 3. 723 | 3. 729 | 3. 735 | 800    |
| 810        | 3. 735 | 3. 741 | 3. 746 | 3. 752 | 3. 758 | 3. 764 | 3. 770 | 3. 776 | 3. 782 | 3. 788 | 3. 794 | 810    |
| 820        | 3. 794 | 3. 799 | 3. 805 | 3. 811 | 3. 817 | 3. 823 | 3. 829 | 3. 835 | 3. 841 | 3. 846 | 3. 852 | 820    |
| 830        | 3. 852 | 3. 858 | 3. 864 | 3. 870 | 3. 876 | 3. 882 | 3. 888 | 3. 894 | 3. 899 | 3. 905 | 3. 911 | 830    |
| 840        | 3. 911 | 3. 917 | 3. 923 | 3. 929 | 3. 935 | 3. 941 | 3. 946 | 3. 952 | 3. 958 | 3. 964 | 3. 970 | 840    |
| 850        | 3. 970 | 3. 976 | 3. 982 | 3. 988 | 3. 994 | 3. 999 | 4. 005 | 4. 011 | 4. 017 | 4. 023 | 4. 029 | 850    |
| 860        | 4. 029 | 4. 035 | 4. 041 | 4. 047 | 4. 052 | 4. 058 | 4. 064 | 4. 070 | 4. 075 | 4. 081 | 4. 087 | 860    |
| 870        | 4. 087 | 4. 093 | 4. 099 | 4. 105 | 4. 111 | 4. 116 | 4. 122 | 4. 128 | 4. 134 | 4. 140 | 4. 146 | 870    |
| 880        | 4. 146 | 4. 152 | 4. 158 | 4. 164 | 4. 169 | 4. 175 | 4. 181 | 4. 187 | 4. 193 | 4. 199 | 4. 205 | 880    |
| 890        | 4. 205 | 4. 211 | 4. 217 | 4. 223 | 4. 229 | 4. 235 | 4. 241 | 4. 246 | 4. 252 | 4. 258 | 4. 264 | 890    |
| 900        | 4. 264 | 4. 270 | 4. 276 | 4. 282 | 4. 288 | 4. 294 | 4. 300 | 4. 306 | 4. 312 | 4. 318 | 4. 324 | 900    |
| 910        | 4. 324 | 4. 330 | 4. 336 | 4. 342 | 4. 348 | 4. 354 | 4. 360 | 4. 366 | 4. 372 | 4. 378 | 4. 384 | 910    |
| 920        | 4. 384 | 4. 389 | 4. 395 | 4. 401 | 4. 407 | 4. 413 | 4. 419 | 4. 425 | 4. 431 | 4. 437 | 4. 443 | 920    |
| 930        | 4. 443 | 4. 449 | 4. 455 | 4. 461 | 4. 467 | 4. 473 | 4. 479 | 4. 485 | 4. 491 | 4. 497 | 4. 503 | 930    |
| 940        | 4. 503 | 4. 509 | 4. 515 | 4. 521 | 4. 527 | 4. 533 | 4. 539 | 4. 545 | 4. 551 | 4. 557 | 4. 563 | 940    |
| 950        | 4. 563 | 4. 569 | 4. 575 | 4. 581 | 4. 587 | 4. 593 | 4. 599 | 4. 605 | 4. 612 | 4. 618 | 4. 624 | 950    |
| 960        | 4. 624 | 4. 630 | 4. 636 | 4. 642 | 4. 648 | 4. 654 | 4. 660 | 4. 666 | 4. 672 | 4. 679 | 4. 685 | 960    |
| 970        | 4. 685 | 4. 691 | 4. 697 | 4. 703 | 4. 709 | 4. 715 | 4. 721 | 4. 727 | 4. 733 | 4. 740 | 4. 746 | 970    |
| 980        | 4. 746 | 4. 752 | 4. 758 | 4. 764 | 4. 770 | 4. 776 | 4. 782 | 4. 788 | 4. 794 | 4. 801 | 4. 807 | 980    |
| 990        | 4. 807 | 4. 813 | 4. 819 | 4. 825 | 4. 831 | 4. 837 | 4. 844 | 4. 850 | 4. 856 | 4. 862 | 4. 868 | 990    |
| 1, 000     | 4. 868 | 4. 874 | 4. 881 | 4. 887 | 4. 893 | 4. 899 | 4. 905 | 4. 911 | 4. 917 | 4. 924 | 4. 930 | 1, 000 |
| 1, 010     | 4. 930 | 4. 936 | 4. 942 | 4. 948 | 4. 954 | 4. 960 | 4. 966 | 4. 972 | 4. 979 | 4. 985 | 4. 991 | 1, 010 |
| 1, 020     | 4. 991 | 4. 998 | 5. 004 | 5. 010 | 5. 016 | 5. 022 | 5. 028 | 5. 034 | 5. 041 | 5. 047 | 5. 053 | 1, 020 |
| 1, 030     | 5. 053 | 5. 059 | 5. 066 | 5. 072 | 5. 078 | 5. 084 | 5. 090 | 5. 096 | 5. 102 | 5. 109 | 5. 115 | 1, 030 |
| 1, 040     | 5. 115 | 5. 121 | 5. 127 | 5. 133 | 5. 139 | 5. 146 | 5. 152 | 5. 158 | 5. 164 | 5. 170 | 5. 176 | 1, 040 |
| 1, 050     | 5. 176 | 5. 182 | 5. 189 | 5. 195 | 5. 201 | 5. 208 | 5. 214 | 5. 220 | 5. 226 | 5. 232 | 5. 238 | 1, 050 |
| 1, 060     | 5. 238 | 5. 244 | 5. 251 | 5. 257 | 5. 263 | 5. 270 | 5. 276 | 5. 282 | 5. 288 | 5. 294 | 5. 301 | 1, 060 |
| 1, 070     | 5. 301 | 5. 307 | 5. 313 | 5. 319 | 5. 326 | 5. 332 | 5. 338 | 5. 344 | 5. 351 | 5. 357 | 5. 363 | 1, 070 |
| 1, 080     | 5. 363 | 5. 369 | 5. 376 | 5. 382 | 5. 388 | 5. 394 | 5. 401 | 5. 407 | 5. 413 | 5. 419 | 5. 426 | 1, 080 |
| 1, 090     | 5. 426 | 5. 432 | 5. 438 | 5. 444 | 5. 450 | 5. 457 | 5. 463 | 5. 469 | 5. 476 | 5. 482 | 5. 488 | 1, 090 |
| 1, 100     | 5. 488 | 5. 494 | 5. 501 | 5. 507 | 5. 513 | 5. 519 | 5. 526 | 5. 532 | 5. 538 | 5. 544 | 5. 551 | 1, 100 |
| 1, 110     | 5. 551 | 5. 557 | 5. 563 | 5. 570 | 5. 576 | 5. 582 | 5. 589 | 5. 595 | 5. 601 | 5. 607 | 5. 614 | 1, 110 |
| 1, 120     | 5. 614 | 5. 620 | 5. 626 | 5. 633 | 5. 639 | 5. 645 | 5. 652 | 5. 658 | 5. 664 | 5. 671 | 5. 677 | 1, 120 |
| 1, 130     | 5. 677 | 5. 684 | 5. 690 | 5. 696 | 5. 703 | 5. 709 | 5. 716 | 5. 722 | 5. 728 | 5. 734 | 5. 741 | 1, 130 |
| 1, 140     | 5. 741 | 5. 747 | 5. 753 | 5. 760 | 5. 766 | 5. 773 | 5. 779 | 5. 786 | 5. 792 | 5. 798 | 5. 805 | 1, 140 |
| 1, 150     | 5. 805 | 5. 811 | 5. 817 | 5. 824 | 5. 830 | 5. 837 | 5. 843 | 5. 849 | 5. 856 | 5. 862 | 5. 869 | 1, 150 |
| 1, 160     | 5. 869 | 5. 875 | 5. 881 | 5. 888 | 5. 894 | 5. 901 | 5. 907 | 5. 913 | 5. 920 | 5. 926 | 5. 933 | 1, 160 |
| 1, 170     | 5. 933 | 5. 939 | 5. 945 | 5. 952 | 5. 958 | 5. 964 | 5. 971 | 5. 977 | 5. 983 | 5. 990 | 5. 996 | 1, 170 |
| 1, 180     | 5. 996 | 6. 003 | 6. 009 | 6. 015 | 6. 022 | 6. 028 | 6. 035 | 6. 041 | 6. 047 | 6. 054 | 6. 060 | 1, 180 |
| 1, 190     | 6. 060 | 6. 067 | 6. 073 | 6. 079 | 6. 086 | 6. 092 | 6. 099 | 6. 105 | 6. 111 | 6. 118 | 6. 125 | 1, 190 |
| 1, 200     | 6. 125 | 6. 131 | 6. 137 | 6. 143 | 6. 150 | 6. 156 | 6. 163 | 6. 169 | 6. 175 | 6. 182 | 6. 188 | 1, 200 |
| ° F        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F    |

\*Based on the International Temperature Scale of 1948.



**Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F    | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F    |
|--------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|        | Millivolts |        |        |        |        |        |        |        |        |        |        |        |
| 1, 200 | 6. 125     | 6. 131 | 6. 137 | 6. 143 | 6. 150 | 6. 156 | 6. 163 | 6. 169 | 6. 175 | 6. 182 | 6. 188 | 1, 200 |
| 1, 210 | 6. 188     | 6. 195 | 6. 201 | 6. 207 | 6. 214 | 6. 220 | 6. 227 | 6. 233 | 6. 239 | 6. 246 | 6. 252 | 1, 210 |
| 1, 220 | 6. 252     | 6. 259 | 6. 265 | 6. 272 | 6. 278 | 6. 285 | 6. 291 | 6. 298 | 6. 304 | 6. 310 | 6. 317 | 1, 220 |
| 1, 230 | 6. 317     | 6. 323 | 6. 329 | 6. 336 | 6. 342 | 6. 349 | 6. 355 | 6. 362 | 6. 368 | 6. 375 | 6. 381 | 1, 230 |
| 1, 240 | 6. 381     | 6. 388 | 6. 394 | 6. 401 | 6. 407 | 6. 414 | 6. 420 | 6. 427 | 6. 433 | 6. 440 | 6. 446 | 1, 240 |
| 1, 250 | 6. 446     | 6. 453 | 6. 459 | 6. 466 | 6. 472 | 6. 479 | 6. 485 | 6. 492 | 6. 498 | 6. 505 | 6. 511 | 1, 250 |
| 1, 260 | 6. 511     | 6. 518 | 6. 524 | 6. 531 | 6. 537 | 6. 544 | 6. 550 | 6. 557 | 6. 563 | 6. 570 | 6. 577 | 1, 260 |
| 1, 270 | 6. 577     | 6. 583 | 6. 589 | 6. 596 | 6. 602 | 6. 609 | 6. 616 | 6. 622 | 6. 629 | 6. 635 | 6. 642 | 1, 270 |
| 1, 280 | 6. 642     | 6. 648 | 6. 655 | 6. 661 | 6. 668 | 6. 674 | 6. 681 | 6. 687 | 6. 694 | 6. 701 | 6. 707 | 1, 280 |
| 1, 290 | 6. 707     | 6. 714 | 6. 720 | 6. 727 | 6. 733 | 6. 740 | 6. 746 | 6. 753 | 6. 759 | 6. 766 | 6. 773 | 1, 290 |
| 1, 300 | 6. 773     | 6. 779 | 6. 786 | 6. 792 | 6. 799 | 6. 805 | 6. 812 | 6. 818 | 6. 825 | 6. 832 | 6. 838 | 1, 300 |
| 1, 310 | 6. 838     | 6. 845 | 6. 851 | 6. 858 | 6. 865 | 6. 871 | 6. 877 | 6. 884 | 6. 891 | 6. 898 | 6. 904 | 1, 310 |
| 1, 320 | 6. 904     | 6. 911 | 6. 917 | 6. 924 | 6. 931 | 6. 937 | 6. 943 | 6. 950 | 6. 957 | 6. 964 | 6. 970 | 1, 320 |
| 1, 330 | 6. 970     | 6. 977 | 6. 983 | 6. 990 | 6. 997 | 7. 003 | 7. 010 | 7. 017 | 7. 023 | 7. 030 | 7. 037 | 1, 330 |
| 1, 340 | 7. 037     | 7. 043 | 7. 049 | 7. 056 | 7. 063 | 7. 069 | 7. 076 | 7. 083 | 7. 089 | 7. 096 | 7. 103 | 1, 340 |
| 1, 350 | 7. 103     | 7. 109 | 7. 116 | 7. 123 | 7. 129 | 7. 136 | 7. 143 | 7. 149 | 7. 155 | 7. 162 | 7. 169 | 1, 350 |
| 1, 360 | 7. 169     | 7. 175 | 7. 182 | 7. 189 | 7. 195 | 7. 202 | 7. 209 | 7. 215 | 7. 222 | 7. 229 | 7. 235 | 1, 360 |
| 1, 370 | 7. 235     | 7. 242 | 7. 249 | 7. 255 | 7. 262 | 7. 269 | 7. 275 | 7. 282 | 7. 289 | 7. 295 | 7. 302 | 1, 370 |
| 1, 380 | 7. 302     | 7. 309 | 7. 315 | 7. 322 | 7. 329 | 7. 336 | 7. 342 | 7. 349 | 7. 356 | 7. 362 | 7. 369 | 1, 380 |
| 1, 390 | 7. 369     | 7. 376 | 7. 382 | 7. 389 | 7. 396 | 7. 403 | 7. 409 | 7. 416 | 7. 423 | 7. 429 | 7. 436 | 1, 390 |
| 1, 400 | 7. 436     | 7. 443 | 7. 449 | 7. 456 | 7. 463 | 7. 470 | 7. 477 | 7. 483 | 7. 490 | 7. 497 | 7. 503 | 1, 400 |
| 1, 410 | 7. 503     | 7. 510 | 7. 517 | 7. 523 | 7. 530 | 7. 537 | 7. 544 | 7. 551 | 7. 557 | 7. 564 | 7. 571 | 1, 410 |
| 1, 420 | 7. 571     | 7. 578 | 7. 585 | 7. 591 | 7. 598 | 7. 605 | 7. 611 | 7. 618 | 7. 625 | 7. 632 | 7. 639 | 1, 420 |
| 1, 430 | 7. 639     | 7. 645 | 7. 652 | 7. 659 | 7. 665 | 7. 672 | 7. 679 | 7. 686 | 7. 693 | 7. 699 | 7. 706 | 1, 430 |
| 1, 440 | 7. 706     | 7. 713 | 7. 720 | 7. 727 | 7. 733 | 7. 740 | 7. 747 | 7. 754 | 7. 761 | 7. 767 | 7. 774 | 1, 440 |
| 1, 450 | 7. 774     | 7. 781 | 7. 788 | 7. 795 | 7. 801 | 7. 808 | 7. 815 | 7. 822 | 7. 829 | 7. 835 | 7. 842 | 1, 450 |
| 1, 460 | 7. 842     | 7. 849 | 7. 856 | 7. 863 | 7. 870 | 7. 877 | 7. 884 | 7. 891 | 7. 897 | 7. 904 | 7. 911 | 1, 460 |
| 1, 470 | 7. 911     | 7. 918 | 7. 924 | 7. 931 | 7. 938 | 7. 945 | 7. 952 | 7. 959 | 7. 965 | 7. 972 | 7. 979 | 1, 470 |
| 1, 480 | 7. 979     | 7. 986 | 7. 993 | 7. 999 | 8. 006 | 8. 013 | 8. 020 | 8. 027 | 8. 033 | 8. 040 | 8. 047 | 1, 480 |
| 1, 490 | 8. 047     | 8. 054 | 8. 061 | 8. 068 | 8. 075 | 8. 081 | 8. 089 | 8. 095 | 8. 102 | 8. 109 | 8. 116 | 1, 490 |
| 1, 500 | 8. 116     | 8. 123 | 8. 129 | 8. 136 | 8. 143 | 8. 150 | 8. 157 | 8. 163 | 8. 170 | 8. 177 | 8. 184 | 1, 500 |
| 1, 510 | 8. 184     | 8. 191 | 8. 198 | 8. 205 | 8. 212 | 8. 218 | 8. 225 | 8. 232 | 8. 239 | 8. 246 | 8. 253 | 1, 510 |
| 1, 520 | 8. 253     | 8. 260 | 8. 267 | 8. 274 | 8. 281 | 8. 287 | 8. 294 | 8. 301 | 8. 308 | 8. 315 | 8. 322 | 1, 520 |
| 1, 530 | 8. 322     | 8. 329 | 8. 336 | 8. 343 | 8. 350 | 8. 356 | 8. 363 | 8. 370 | 8. 377 | 8. 384 | 8. 391 | 1, 530 |
| 1, 540 | 8. 391     | 8. 398 | 8. 405 | 8. 412 | 8. 419 | 8. 426 | 8. 433 | 8. 439 | 8. 446 | 8. 453 | 8. 460 | 1, 540 |
| 1, 550 | 8. 460     | 8. 467 | 8. 474 | 8. 481 | 8. 488 | 8. 495 | 8. 502 | 8. 509 | 8. 516 | 8. 523 | 8. 530 | 1, 550 |
| 1, 560 | 8. 530     | 8. 537 | 8. 544 | 8. 551 | 8. 558 | 8. 565 | 8. 571 | 8. 578 | 8. 585 | 8. 592 | 8. 599 | 1, 560 |
| 1, 570 | 8. 599     | 8. 606 | 8. 613 | 8. 620 | 8. 627 | 8. 634 | 8. 641 | 8. 648 | 8. 655 | 8. 662 | 8. 669 | 1, 570 |
| 1, 580 | 8. 669     | 8. 676 | 8. 683 | 8. 690 | 8. 697 | 8. 704 | 8. 711 | 8. 718 | 8. 725 | 8. 732 | 8. 739 | 1, 580 |
| 1, 590 | 8. 739     | 8. 746 | 8. 753 | 8. 760 | 8. 767 | 8. 774 | 8. 781 | 8. 788 | 8. 795 | 8. 802 | 8. 809 | 1, 590 |
| 1, 600 | 8. 809     | 8. 816 | 8. 823 | 8. 830 | 8. 837 | 8. 844 | 8. 851 | 8. 858 | 8. 865 | 8. 872 | 8. 879 | 1, 600 |
| ° F    | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F    |

\*Based on the International Temperature Scale of 1948.

# Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F    | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° F    |
|--------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
|        | Millivolts |         |         |         |         |         |         |         |         |         |         |        |
| 1, 600 | 8. 809     | 8. 816  | 8. 823  | 8. 830  | 8. 837  | 8. 844  | 8. 851  | 8. 858  | 8. 865  | 8. 872  | 8. 879  | 1, 600 |
| 1, 610 | 8. 879     | 8. 886  | 8. 893  | 8. 900  | 8. 907  | 8. 914  | 8. 921  | 8. 928  | 8. 935  | 8. 942  | 8. 949  | 1, 610 |
| 1, 620 | 8. 949     | 8. 956  | 8. 963  | 8. 970  | 8. 977  | 8. 984  | 8. 991  | 8. 998  | 9. 005  | 9. 012  | 9. 019  | 1, 620 |
| 1, 630 | 9. 019     | 9. 026  | 9. 033  | 9. 040  | 9. 047  | 9. 054  | 9. 061  | 9. 068  | 9. 075  | 9. 082  | 9. 090  | 1, 630 |
| 1, 640 | 9. 090     | 9. 097  | 9. 104  | 9. 111  | 9. 118  | 9. 125  | 9. 132  | 9. 139  | 9. 146  | 9. 153  | 9. 161  | 1, 640 |
| 1, 650 | 9. 161     | 9. 168  | 9. 175  | 9. 182  | 9. 189  | 9. 196  | 9. 203  | 9. 210  | 9. 218  | 9. 225  | 9. 232  | 1, 650 |
| 1, 660 | 9. 232     | 9. 239  | 9. 246  | 9. 253  | 9. 260  | 9. 267  | 9. 274  | 9. 281  | 9. 289  | 9. 296  | 9. 303  | 1, 660 |
| 1, 670 | 9. 303     | 9. 310  | 9. 317  | 9. 324  | 9. 331  | 9. 338  | 9. 345  | 9. 353  | 9. 360  | 9. 367  | 9. 374  | 1, 670 |
| 1, 680 | 9. 374     | 9. 381  | 9. 388  | 9. 395  | 9. 402  | 9. 409  | 9. 416  | 9. 424  | 9. 431  | 9. 438  | 9. 445  | 1, 680 |
| 1, 690 | 9. 445     | 9. 452  | 9. 459  | 9. 466  | 9. 474  | 9. 481  | 9. 488  | 9. 495  | 9. 502  | 9. 509  | 9. 516  | 1, 690 |
| 1, 700 | 9. 516     | 9. 523  | 9. 531  | 9. 538  | 9. 545  | 9. 552  | 9. 559  | 9. 566  | 9. 573  | 9. 580  | 9. 587  | 1, 700 |
| 1, 710 | 9. 587     | 9. 594  | 9. 602  | 9. 609  | 9. 616  | 9. 623  | 9. 630  | 9. 637  | 9. 644  | 9. 651  | 9. 659  | 1, 710 |
| 1, 720 | 9. 659     | 9. 666  | 9. 673  | 9. 680  | 9. 687  | 9. 694  | 9. 701  | 9. 709  | 9. 716  | 9. 723  | 9. 730  | 1, 720 |
| 1, 730 | 9. 730     | 9. 737  | 9. 744  | 9. 751  | 9. 759  | 9. 766  | 9. 773  | 9. 780  | 9. 787  | 9. 794  | 9. 802  | 1, 730 |
| 1, 740 | 9. 802     | 9. 809  | 9. 816  | 9. 823  | 9. 830  | 9. 838  | 9. 845  | 9. 852  | 9. 859  | 9. 866  | 9. 874  | 1, 740 |
| 1, 750 | 9. 874     | 9. 881  | 9. 888  | 9. 895  | 9. 902  | 9. 910  | 9. 917  | 9. 924  | 9. 931  | 9. 939  | 9. 946  | 1, 750 |
| 1, 760 | 9. 946     | 9. 953  | 9. 961  | 9. 968  | 9. 975  | 9. 982  | 9. 990  | 9. 997  | 10. 004 | 10. 012 | 10. 019 | 1, 760 |
| 1, 770 | 10. 019    | 10. 026 | 10. 034 | 10. 041 | 10. 048 | 10. 056 | 10. 063 | 10. 070 | 10. 077 | 10. 084 | 10. 092 | 1, 770 |
| 1, 780 | 10. 092    | 10. 099 | 10. 106 | 10. 114 | 10. 121 | 10. 129 | 10. 136 | 10. 143 | 10. 150 | 10. 157 | 10. 164 | 1, 780 |
| 1, 790 | 10. 164    | 10. 172 | 10. 179 | 10. 186 | 10. 194 | 10. 201 | 10. 208 | 10. 215 | 10. 223 | 10. 230 | 10. 237 | 1, 790 |
| 1, 800 | 10. 237    | 10. 244 | 10. 251 | 10. 259 | 10. 266 | 10. 274 | 10. 281 | 10. 288 | 10. 296 | 10. 303 | 10. 310 | 1, 800 |
| 1, 810 | 10. 310    | 10. 318 | 10. 325 | 10. 332 | 10. 339 | 10. 347 | 10. 354 | 10. 361 | 10. 369 | 10. 376 | 10. 383 | 1, 810 |
| 1, 820 | 10. 383    | 10. 391 | 10. 398 | 10. 405 | 10. 412 | 10. 420 | 10. 427 | 10. 434 | 10. 441 | 10. 449 | 10. 456 | 1, 820 |
| 1, 830 | 10. 456    | 10. 464 | 10. 471 | 10. 478 | 10. 485 | 10. 493 | 10. 500 | 10. 507 | 10. 514 | 10. 522 | 10. 529 | 1, 830 |
| 1, 840 | 10. 529    | 10. 537 | 10. 544 | 10. 551 | 10. 559 | 10. 566 | 10. 574 | 10. 581 | 10. 588 | 10. 596 | 10. 603 | 1, 840 |
| 1, 850 | 10. 603    | 10. 610 | 10. 618 | 10. 625 | 10. 632 | 10. 639 | 10. 647 | 10. 654 | 10. 661 | 10. 669 | 10. 676 | 1, 850 |
| 1, 860 | 10. 676    | 10. 683 | 10. 691 | 10. 698 | 10. 705 | 10. 712 | 10. 720 | 10. 727 | 10. 735 | 10. 742 | 10. 749 | 1, 860 |
| 1, 870 | 10. 749    | 10. 757 | 10. 764 | 10. 771 | 10. 779 | 10. 786 | 10. 794 | 10. 801 | 10. 809 | 10. 816 | 10. 823 | 1, 870 |
| 1, 880 | 10. 823    | 10. 831 | 10. 839 | 10. 846 | 10. 854 | 10. 861 | 10. 869 | 10. 876 | 10. 884 | 10. 891 | 10. 898 | 1, 880 |
| 1, 890 | 10. 898    | 10. 906 | 10. 914 | 10. 921 | 10. 929 | 10. 936 | 10. 944 | 10. 951 | 10. 959 | 10. 966 | 10. 973 | 1, 890 |
| 1, 900 | 10. 973    | 10. 981 | 10. 988 | 10. 996 | 11. 003 | 11. 011 | 11. 018 | 11. 026 | 11. 033 | 11. 040 | 11. 048 | 1, 900 |
| 1, 910 | 11. 048    | 11. 055 | 11. 063 | 11. 070 | 11. 078 | 11. 085 | 11. 093 | 11. 100 | 11. 108 | 11. 115 | 11. 122 | 1, 910 |
| 1, 920 | 11. 122    | 11. 130 | 11. 138 | 11. 145 | 11. 153 | 11. 160 | 11. 168 | 11. 175 | 11. 183 | 11. 190 | 11. 197 | 1, 920 |
| 1, 930 | 11. 197    | 11. 205 | 11. 213 | 11. 220 | 11. 228 | 11. 235 | 11. 243 | 11. 250 | 11. 258 | 11. 265 | 11. 273 | 1, 930 |
| 1, 940 | 11. 273    | 11. 280 | 11. 288 | 11. 295 | 11. 303 | 11. 310 | 11. 318 | 11. 325 | 11. 333 | 11. 340 | 11. 348 | 1, 940 |
| 1, 950 | 11. 348    | 11. 355 | 11. 363 | 11. 371 | 11. 379 | 11. 385 | 11. 393 | 11. 401 | 11. 408 | 11. 416 | 11. 424 | 1, 950 |
| 1, 960 | 11. 424    | 11. 431 | 11. 439 | 11. 446 | 11. 454 | 11. 461 | 11. 468 | 11. 476 | 11. 484 | 11. 492 | 11. 499 | 1, 960 |
| 1, 970 | 11. 499    | 11. 507 | 11. 515 | 11. 522 | 11. 529 | 11. 537 | 11. 544 | 11. 552 | 11. 560 | 11. 568 | 11. 575 | 1, 970 |
| 1, 980 | 11. 575    | 11. 582 | 11. 590 | 11. 598 | 11. 605 | 11. 613 | 11. 620 | 11. 628 | 11. 636 | 11. 643 | 11. 651 | 1, 980 |
| 1, 990 | 11. 651    | 11. 658 | 11. 666 | 11. 674 | 11. 681 | 11. 689 | 11. 696 | 11. 704 | 11. 712 | 11. 719 | 11. 726 | 1, 990 |
| 2, 000 | 11. 726    | 11. 734 | 11. 742 | 11. 749 | 11. 757 | 11. 765 | 11. 772 | 11. 779 | 11. 787 | 11. 795 | 11. 802 | 2, 000 |
| ° F    | 0          | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° F    |

\*Based on the International Temperature Scale of 1948.



**Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F   | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F   |
|-------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
|       | Millivolts |        |        |        |        |        |        |        |        |        |        |       |
| 2,000 | 11.726     | 11.734 | 11.742 | 11.749 | 11.757 | 11.765 | 11.772 | 11.779 | 11.787 | 11.795 | 11.802 | 2,000 |
| 2,010 | 11.802     | 11.810 | 11.817 | 11.825 | 11.832 | 11.840 | 11.848 | 11.855 | 11.863 | 11.871 | 11.878 | 2,010 |
| 2,020 | 11.878     | 11.885 | 11.893 | 11.901 | 11.908 | 11.916 | 11.924 | 11.931 | 11.938 | 11.946 | 11.954 | 2,020 |
| 2,030 | 11.954     | 11.961 | 11.969 | 11.976 | 11.984 | 11.992 | 11.999 | 12.007 | 12.014 | 12.022 | 12.029 | 2,030 |
| 2,040 | 12.029     | 12.037 | 12.045 | 12.052 | 12.060 | 12.068 | 12.075 | 12.082 | 12.090 | 12.098 | 12.105 | 2,040 |
| 2,050 | 12.105     | 12.113 | 12.121 | 12.128 | 12.136 | 12.144 | 12.151 | 12.159 | 12.166 | 12.174 | 12.182 | 2,050 |
| 2,060 | 12.182     | 12.189 | 12.197 | 12.205 | 12.212 | 12.220 | 12.227 | 12.235 | 12.243 | 12.250 | 12.258 | 2,060 |
| 2,070 | 12.258     | 12.265 | 12.273 | 12.281 | 12.288 | 12.296 | 12.304 | 12.312 | 12.319 | 12.327 | 12.335 | 2,070 |
| 2,080 | 12.335     | 12.342 | 12.350 | 12.358 | 12.365 | 12.373 | 12.381 | 12.388 | 12.396 | 12.403 | 12.411 | 2,080 |
| 2,090 | 12.411     | 12.419 | 12.427 | 12.434 | 12.442 | 12.450 | 12.458 | 12.465 | 12.473 | 12.480 | 12.488 | 2,090 |
| 2,100 | 12.488     | 12.495 | 12.503 | 12.511 | 12.518 | 12.526 | 12.534 | 12.541 | 12.549 | 12.557 | 12.564 | 2,100 |
| 2,110 | 12.564     | 12.572 | 12.579 | 12.587 | 12.595 | 12.602 | 12.610 | 12.618 | 12.625 | 12.633 | 12.641 | 2,110 |
| 2,120 | 12.641     | 12.648 | 12.656 | 12.664 | 12.672 | 12.679 | 12.687 | 12.695 | 12.702 | 12.710 | 12.718 | 2,120 |
| 2,130 | 12.718     | 12.725 | 12.733 | 12.741 | 12.748 | 12.756 | 12.764 | 12.772 | 12.779 | 12.787 | 12.795 | 2,130 |
| 2,140 | 12.795     | 12.802 | 12.810 | 12.818 | 12.825 | 12.833 | 12.841 | 12.848 | 12.856 | 12.864 | 12.871 | 2,140 |
| 2,150 | 12.871     | 12.879 | 12.887 | 12.894 | 12.902 | 12.909 | 12.917 | 12.925 | 12.932 | 12.940 | 12.948 | 2,150 |
| 2,160 | 12.948     | 12.955 | 12.963 | 12.971 | 12.978 | 12.986 | 12.994 | 13.002 | 13.009 | 13.017 | 13.025 | 2,160 |
| 2,170 | 13.025     | 13.032 | 13.040 | 13.048 | 13.055 | 13.063 | 13.071 | 13.078 | 13.086 | 13.094 | 13.102 | 2,170 |
| 2,180 | 13.102     | 13.109 | 13.117 | 13.125 | 13.132 | 13.140 | 13.148 | 13.155 | 13.163 | 13.170 | 13.178 | 2,180 |
| 2,190 | 13.178     | 13.186 | 13.193 | 13.201 | 13.208 | 13.216 | 13.224 | 13.232 | 13.239 | 13.247 | 13.255 | 2,190 |
| 2,200 | 13.255     | 13.263 | 13.270 | 13.278 | 13.285 | 13.293 | 13.301 | 13.309 | 13.316 | 13.324 | 13.332 | 2,200 |
| 2,210 | 13.332     | 13.340 | 13.347 | 13.355 | 13.363 | 13.371 | 13.378 | 13.386 | 13.394 | 13.402 | 13.409 | 2,210 |
| 2,220 | 13.409     | 13.417 | 13.425 | 13.432 | 13.440 | 13.448 | 13.455 | 13.463 | 13.471 | 13.479 | 13.486 | 2,220 |
| 2,230 | 13.486     | 13.494 | 13.502 | 13.509 | 13.517 | 13.525 | 13.532 | 13.540 | 13.548 | 13.556 | 13.564 | 2,230 |
| 2,240 | 13.564     | 13.571 | 13.579 | 13.587 | 13.595 | 13.602 | 13.610 | 13.618 | 13.625 | 13.633 | 13.641 | 2,240 |
| 2,250 | 13.641     | 13.648 | 13.656 | 13.664 | 13.672 | 13.679 | 13.687 | 13.695 | 13.702 | 13.710 | 13.718 | 2,250 |
| 2,260 | 13.718     | 13.725 | 13.733 | 13.741 | 13.749 | 13.756 | 13.764 | 13.772 | 13.779 | 13.787 | 13.795 | 2,260 |
| 2,270 | 13.795     | 13.802 | 13.810 | 13.818 | 13.826 | 13.833 | 13.841 | 13.849 | 13.857 | 13.865 | 13.872 | 2,270 |
| 2,280 | 13.872     | 13.880 | 13.888 | 13.895 | 13.903 | 13.911 | 13.918 | 13.926 | 13.934 | 13.942 | 13.949 | 2,280 |
| 2,290 | 13.949     | 13.957 | 13.965 | 13.972 | 13.980 | 13.988 | 13.995 | 14.003 | 14.011 | 14.019 | 14.027 | 2,290 |
| 2,300 | 14.027     | 14.034 | 14.042 | 14.050 | 14.058 | 14.065 | 14.073 | 14.081 | 14.088 | 14.096 | 14.104 | 2,300 |
| 2,310 | 14.104     | 14.111 | 14.119 | 14.127 | 14.135 | 14.142 | 14.150 | 14.158 | 14.165 | 14.173 | 14.181 | 2,310 |
| 2,320 | 14.181     | 14.188 | 14.196 | 14.204 | 14.212 | 14.219 | 14.227 | 14.235 | 14.242 | 14.250 | 14.258 | 2,320 |
| 2,330 | 14.258     | 14.265 | 14.273 | 14.281 | 14.288 | 14.296 | 14.304 | 14.312 | 14.319 | 14.327 | 14.335 | 2,330 |
| 2,340 | 14.335     | 14.342 | 14.350 | 14.358 | 14.366 | 14.374 | 14.382 | 14.389 | 14.397 | 14.405 | 14.412 | 2,340 |
| 2,350 | 14.412     | 14.420 | 14.428 | 14.435 | 14.443 | 14.451 | 14.459 | 14.467 | 14.475 | 14.482 | 14.490 | 2,350 |
| 2,360 | 14.490     | 14.498 | 14.505 | 14.513 | 14.521 | 14.528 | 14.536 | 14.544 | 14.552 | 14.560 | 14.567 | 2,360 |
| 2,370 | 14.567     | 14.575 | 14.583 | 14.591 | 14.598 | 14.606 | 14.614 | 14.621 | 14.629 | 14.637 | 14.644 | 2,370 |
| 2,380 | 14.644     | 14.652 | 14.660 | 14.668 | 14.675 | 14.683 | 14.691 | 14.698 | 14.706 | 14.714 | 14.721 | 2,380 |
| 2,390 | 14.721     | 14.729 | 14.737 | 14.745 | 14.752 | 14.760 | 14.768 | 14.775 | 14.783 | 14.791 | 14.798 | 2,390 |
| 2,400 | 14.798     | 14.806 | 14.814 | 14.822 | 14.829 | 14.837 | 14.845 | 14.852 | 14.860 | 14.868 | 14.875 | 2,400 |
| ° F   | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F   |

\*Based on the International Temperature Scale of 1948.

# Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F        | 0       | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° F    |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|
| Millivolts |         |         |         |         |         |         |         |         |         |         |         |        |
| 2, 400     | 14. 798 | 14. 806 | 14. 814 | 14. 822 | 14. 829 | 14. 837 | 14. 845 | 14. 852 | 14. 860 | 14. 868 | 14. 875 | 2, 400 |
| 2, 410     | 14. 875 | 14. 883 | 14. 891 | 14. 898 | 14. 906 | 14. 914 | 14. 922 | 14. 929 | 14. 937 | 14. 945 | 14. 952 | 2, 410 |
| 2, 420     | 14. 952 | 14. 960 | 14. 968 | 14. 975 | 14. 983 | 14. 991 | 14. 999 | 15. 006 | 15. 014 | 15. 022 | 15. 029 | 2, 420 |
| 2, 430     | 15. 029 | 15. 037 | 15. 045 | 15. 052 | 15. 060 | 15. 068 | 15. 076 | 15. 084 | 15. 091 | 15. 099 | 15. 107 | 2, 430 |
| 2, 440     | 15. 107 | 15. 115 | 15. 122 | 15. 130 | 15. 138 | 15. 145 | 15. 153 | 15. 161 | 15. 168 | 15. 176 | 15. 184 | 2, 440 |
| 2, 450     | 15. 184 | 15. 192 | 15. 199 | 15. 207 | 15. 215 | 15. 222 | 15. 230 | 15. 238 | 15. 245 | 15. 253 | 15. 261 | 2, 450 |
| 2, 460     | 15. 261 | 15. 268 | 15. 276 | 15. 284 | 15. 292 | 15. 299 | 15. 307 | 15. 315 | 15. 322 | 15. 330 | 15. 338 | 2, 460 |
| 2, 470     | 15. 338 | 15. 345 | 15. 353 | 15. 361 | 15. 369 | 15. 377 | 15. 385 | 15. 392 | 15. 400 | 15. 408 | 15. 415 | 2, 470 |
| 2, 480     | 15. 415 | 15. 423 | 15. 431 | 15. 438 | 15. 446 | 15. 454 | 15. 462 | 15. 469 | 15. 477 | 15. 484 | 15. 492 | 2, 480 |
| 2, 490     | 15. 492 | 15. 500 | 15. 508 | 15. 515 | 15. 523 | 15. 531 | 15. 538 | 15. 546 | 15. 553 | 15. 561 | 15. 568 | 2, 490 |
| 2, 500     | 15. 568 | 15. 576 | 15. 584 | 15. 592 | 15. 599 | 15. 607 | 15. 615 | 15. 623 | 15. 630 | 15. 638 | 15. 645 | 2, 500 |
| 2, 510     | 15. 645 | 15. 653 | 15. 661 | 15. 668 | 15. 676 | 15. 684 | 15. 692 | 15. 700 | 15. 707 | 15. 715 | 15. 722 | 2, 510 |
| 2, 520     | 15. 722 | 15. 730 | 15. 738 | 15. 745 | 15. 753 | 15. 761 | 15. 769 | 15. 777 | 15. 785 | 15. 792 | 15. 800 | 2, 520 |
| 2, 530     | 15. 800 | 15. 808 | 15. 815 | 15. 823 | 15. 831 | 15. 838 | 15. 846 | 15. 854 | 15. 862 | 15. 869 | 15. 877 | 2, 530 |
| 2, 540     | 15. 877 | 15. 885 | 15. 892 | 15. 900 | 15. 908 | 15. 915 | 15. 923 | 15. 931 | 15. 938 | 15. 946 | 15. 954 | 2, 540 |
| 2, 550     | 15. 954 | 15. 962 | 15. 969 | 15. 977 | 15. 985 | 15. 992 | 16. 000 | 16. 008 | 16. 015 | 16. 023 | 16. 031 | 2, 550 |
| 2, 560     | 16. 031 | 16. 039 | 16. 046 | 16. 054 | 16. 062 | 16. 070 | 16. 078 | 16. 085 | 16. 093 | 16. 101 | 16. 108 | 2, 560 |
| 2, 570     | 16. 108 | 16. 116 | 16. 124 | 16. 132 | 16. 139 | 16. 147 | 16. 155 | 16. 163 | 16. 170 | 16. 178 | 16. 185 | 2, 570 |
| 2, 580     | 16. 185 | 16. 193 | 16. 201 | 16. 208 | 16. 216 | 16. 224 | 16. 232 | 16. 240 | 16. 247 | 16. 255 | 16. 263 | 2, 580 |
| 2, 590     | 16. 263 | 16. 271 | 16. 278 | 16. 286 | 16. 294 | 16. 301 | 16. 309 | 16. 317 | 16. 325 | 16. 332 | 16. 340 | 2, 590 |
| 2, 600     | 16. 340 | 16. 348 | 16. 355 | 16. 363 | 16. 371 | 16. 378 | 16. 386 | 16. 394 | 16. 402 | 16. 409 | 16. 417 | 2, 600 |
| 2, 610     | 16. 417 | 16. 425 | 16. 432 | 16. 440 | 16. 448 | 16. 455 | 16. 463 | 16. 471 | 16. 478 | 16. 486 | 16. 494 | 2, 610 |
| 2, 620     | 16. 494 | 16. 502 | 16. 509 | 16. 517 | 16. 524 | 16. 532 | 16. 540 | 16. 548 | 16. 556 | 16. 564 | 16. 571 | 2, 620 |
| 2, 630     | 16. 571 | 16. 579 | 16. 586 | 16. 594 | 16. 602 | 16. 610 | 16. 618 | 16. 625 | 16. 633 | 16. 641 | 16. 648 | 2, 630 |
| 2, 640     | 16. 648 | 16. 656 | 16. 663 | 16. 671 | 16. 679 | 16. 687 | 16. 695 | 16. 702 | 16. 710 | 16. 718 | 16. 725 | 2, 640 |
| 2, 650     | 16. 725 | 16. 733 | 16. 741 | 16. 748 | 16. 756 | 16. 764 | 16. 772 | 16. 780 | 16. 788 | 16. 795 | 16. 802 | 2, 650 |
| 2, 660     | 16. 802 | 16. 810 | 16. 818 | 16. 826 | 16. 834 | 16. 842 | 16. 849 | 16. 857 | 16. 865 | 16. 872 | 16. 880 | 2, 660 |
| 2, 670     | 16. 880 | 16. 887 | 16. 895 | 16. 903 | 16. 911 | 16. 918 | 16. 926 | 16. 933 | 16. 941 | 16. 949 | 16. 957 | 2, 670 |
| 2, 680     | 16. 957 | 16. 964 | 16. 972 | 16. 979 | 16. 987 | 16. 995 | 17. 002 | 17. 010 | 17. 018 | 17. 025 | 17. 033 | 2, 680 |
| 2, 690     | 17. 033 | 17. 041 | 17. 048 | 17. 056 | 17. 064 | 17. 072 | 17. 079 | 17. 087 | 17. 095 | 17. 102 | 17. 110 | 2, 690 |
| 2, 700     | 17. 110 | 17. 118 | 17. 125 | 17. 133 | 17. 141 | 17. 148 | 17. 156 | 17. 163 | 17. 171 | 17. 179 | 17. 186 | 2, 700 |
| 2, 710     | 17. 186 | 17. 194 | 17. 202 | 17. 209 | 17. 217 | 17. 225 | 17. 232 | 17. 240 | 17. 248 | 17. 255 | 17. 263 | 2, 710 |
| 2, 720     | 17. 263 | 17. 271 | 17. 278 | 17. 286 | 17. 294 | 17. 301 | 17. 309 | 17. 317 | 17. 325 | 17. 332 | 17. 340 | 2, 720 |
| 2, 730     | 17. 340 | 17. 347 | 17. 355 | 17. 363 | 17. 370 | 17. 378 | 17. 385 | 17. 393 | 17. 401 | 17. 408 | 17. 416 | 2, 730 |
| 2, 740     | 17. 416 | 17. 424 | 17. 432 | 17. 439 | 17. 447 | 17. 455 | 17. 462 | 17. 470 | 17. 478 | 17. 485 | 17. 493 | 2, 740 |
| 2, 750     | 17. 493 | 17. 500 | 17. 508 | 17. 516 | 17. 524 | 17. 532 | 17. 539 | 17. 546 | 17. 554 | 17. 562 | 17. 569 | 2, 750 |
| 2, 760     | 17. 569 | 17. 577 | 17. 585 | 17. 592 | 17. 600 | 17. 608 | 17. 615 | 17. 623 | 17. 631 | 17. 638 | 17. 646 | 2, 760 |
| 2, 770     | 17. 646 | 17. 654 | 17. 662 | 17. 669 | 17. 677 | 17. 685 | 17. 692 | 17. 700 | 17. 708 | 17. 715 | 17. 723 | 2, 770 |
| 2, 780     | 17. 723 | 17. 731 | 17. 738 | 17. 746 | 17. 753 | 17. 761 | 17. 768 | 17. 776 | 17. 784 | 17. 792 | 17. 799 | 2, 780 |
| 2, 790     | 17. 799 | 17. 807 | 17. 814 | 17. 822 | 17. 830 | 17. 837 | 17. 845 | 17. 852 | 17. 860 | 17. 868 | 17. 875 | 2, 790 |
| 2, 800     | 17. 875 | 17. 882 | 17. 890 | 17. 898 | 17. 906 | 17. 913 | 17. 921 | 17. 928 | 17. 936 | 17. 944 | 17. 951 | 2, 800 |
| ° F        | 0       | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | ° F    |

\*Based on the International Temperature Scale of 1948.



**Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| °F    | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °F    |
|-------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
|       | Millivolts |        |        |        |        |        |        |        |        |        |        |       |
| 2,800 | 17.875     | 17.882 | 17.890 | 17.898 | 17.906 | 17.913 | 17.921 | 17.928 | 17.936 | 17.944 | 17.951 | 2,800 |
| 2,810 | 17.951     | 17.958 | 17.966 | 17.974 | 17.982 | 17.989 | 17.997 | 18.004 | 18.012 | 18.020 | 18.027 | 2,810 |
| 2,820 | 18.027     | 18.035 | 18.043 | 18.050 | 18.058 | 18.065 | 18.073 | 18.080 | 18.088 | 18.096 | 18.103 | 2,820 |
| 2,830 | 18.103     | 18.111 | 18.119 | 18.126 | 18.134 | 18.141 | 18.149 | 18.156 | 18.164 | 18.172 | 18.179 | 2,830 |
| 2,840 | 18.179     | 18.187 | 18.195 | 18.202 | 18.210 | 18.218 | 18.225 | 18.233 | 18.240 | 18.248 | 18.255 | 2,840 |
| 2,850 | 18.255     | 18.263 | 18.271 | 18.278 | 18.286 | 18.294 | 18.301 | 18.309 | 18.316 | 18.324 | 18.332 | 2,850 |
| 2,860 | 18.332     | 18.339 | 18.347 | 18.355 | 18.362 | 18.370 | 18.377 | 18.385 | 18.392 | 18.400 | 18.408 | 2,860 |
| 2,870 | 18.408     | 18.415 | 18.423 | 18.431 | 18.438 | 18.446 | 18.453 | 18.461 | 18.468 | 18.476 | 18.484 | 2,870 |
| 2,880 | 18.484     | 18.492 | 18.499 | 18.507 | 18.514 | 18.522 | 18.529 | 18.537 | 18.545 | 18.552 | 18.560 | 2,880 |
| 2,890 | 18.560     | 18.568 | 18.575 | 18.583 | 18.590 | 18.598 | 18.605 | 18.613 | 18.621 | 18.628 | 18.636 | 2,890 |
| 2,900 | 18.636     | 18.644 | 18.651 | 18.659 | 18.666 | 18.674 | 18.681 | 18.689 | 18.697 | 18.705 | 18.712 | 2,900 |
| 2,910 | 18.712     | 18.720 | 18.727 | 18.735 | 18.743 | 18.750 | 18.758 | 18.765 | 18.773 | 18.781 | 18.788 | 2,910 |
| 2,920 | 18.788     | 18.796 | 18.803 | 18.811 | 18.819 | 18.826 | 18.834 | 18.842 | 18.849 | 18.857 | 18.864 | 2,920 |
| 2,930 | 18.864     | 18.872 | 18.879 | 18.887 | 18.895 | 18.902 | 18.910 | 18.918 | 18.925 | 18.932 | 18.940 | 2,930 |
| 2,940 | 18.940     | 18.948 | 18.955 | 18.963 | 18.971 | 18.978 | 18.986 | 18.993 | 19.001 | 19.008 | 19.016 | 2,940 |
| 2,950 | 19.016     | 19.024 | 19.031 | 19.039 | 19.046 | 19.054 | 19.062 | 19.069 | 19.077 | 19.084 | 19.092 | 2,950 |
| 2,960 | 19.092     | 19.099 | 19.107 | 19.115 | 19.122 | 19.129 | 19.137 | 19.145 | 19.152 | 19.160 | 19.168 | 2,960 |
| 2,970 | 19.168     | 19.175 | 19.182 | 19.190 | 19.198 | 19.205 | 19.213 | 19.220 | 19.228 | 19.235 | 19.243 | 2,970 |
| 2,980 | 19.243     | 19.250 | 19.258 | 19.265 | 19.273 | 19.281 | 19.288 | 19.295 | 19.303 | 19.311 | 19.318 | 2,980 |
| 2,990 | 19.318     | 19.326 | 19.333 | 19.341 | 19.348 | 19.356 | 19.364 | 19.371 | 19.378 | 19.386 | 19.394 | 2,990 |
| 3,000 | 19.394     | 19.402 | 19.409 | 19.417 | 19.424 | 19.432 | 19.439 | 19.447 | 19.454 | 19.462 | 19.470 | 3,000 |
| 3,010 | 19.470     | 19.477 | 19.485 | 19.492 | 19.500 | 19.508 | 19.515 | 19.523 | 19.530 | 19.538 | 19.545 | 3,010 |
| 3,020 | 19.545     | 19.553 | 19.561 | 19.568 | 19.576 | 19.583 | 19.591 | 19.598 | 19.606 | 19.614 | 19.621 | 3,020 |
| 3,030 | 19.621     | 19.628 | 19.636 | 19.644 | 19.651 | 19.659 | 19.667 | 19.674 | 19.682 | 19.689 | 19.697 | 3,030 |
| 3,040 | 19.697     | 19.704 | 19.712 | 19.720 | 19.727 | 19.735 | 19.742 | 19.750 | 19.758 | 19.765 | 19.773 | 3,040 |
| 3,050 | 19.773     | 19.780 | 19.788 | 19.795 | 19.803 | 19.811 | 19.818 | 19.826 | 19.833 | 19.841 | 19.848 | 3,050 |
| 3,060 | 19.848     | 19.856 | 19.864 | 19.871 | 19.878 | 19.886 | 19.894 | 19.902 | 19.909 | 19.916 | 19.924 | 3,060 |
| 3,070 | 19.924     | 19.932 | 19.939 | 19.947 | 19.954 | 19.962 | 19.969 | 19.977 | 19.984 | 19.992 | 19.999 | 3,070 |
| 3,080 | 19.999     | 20.007 | 20.014 | 20.022 | 20.029 | 20.037 | 20.044 | 20.052 | 20.059 | 20.067 | 20.075 | 3,080 |
| 3,090 | 20.075     | 20.082 | 20.090 | 20.097 | 20.105 | 20.112 | 20.120 | 20.127 | 20.135 | 20.142 | 20.150 | 3,090 |
| °F    | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °F    |

\*Based on the International Temperature Scale of 1948.

# Table 16. Chromel-Alumel Thermocouples

(Electromotive Force in Absolute Millivolts. Temperature in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .00   | .10   | .20   | .30   | .40   | .50   | .60   | .70   | .80   | .90   | 1.00  | Millivolts |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| Degrees F  |       |       |       |       |       |       |       |       |       |       |       |            |
| -5.00      | -253  | -262  | -270  | -280  | -289  | -299  | -310  | ----- | ----- | ----- | ----- | -5.00      |
| -4.00      | -180  | -187  | -193  | -200  | -207  | -215  | -222  | -229  | -237  | -245  | -253  | -4.00      |
| -3.00      | -119  | -125  | -131  | -137  | -143  | -149  | -155  | -161  | -167  | -174  | -180  | -3.00      |
| -2.00      | -65   | -70   | -76   | -81   | -86   | -92   | -97   | -103  | -108  | -114  | -119  | -2.00      |
| -1.00      | -15   | -20   | -25   | -30   | -35   | -40   | -45   | -50   | -55   | -60   | -65   | -1.00      |
| (-)0.00    | 32    | 27    | 23    | 18    | 14    | 9     | 4     | -1    | -6    | -11   | -15   | (-)0.00    |
| (+)0.00    | 32    | 37    | 41    | 46    | 50    | 55    | 59    | 64    | 68    | 73    | 77    | (+)0.00    |
| 1.00       | 77    | 82    | 86    | 90    | 95    | 99    | 104   | 108   | 113   | 117   | 121   | 1.00       |
| 2.00       | 121   | 126   | 130   | 134   | 139   | 143   | 147   | 152   | 156   | 160   | 165   | 2.00       |
| 3.00       | 165   | 169   | 173   | 178   | 182   | 186   | 191   | 195   | 199   | 203   | 208   | 3.00       |
| 4.00       | 208   | 212   | 216   | 221   | 225   | 230   | 234   | 238   | 243   | 247   | 251   | 4.00       |
| 5.00       | 251   | 256   | 260   | 265   | 269   | 273   | 278   | 282   | 287   | 291   | 296   | 5.00       |
| 6.00       | 296   | 300   | 305   | 309   | 314   | 318   | 323   | 327   | 332   | 336   | 341   | 6.00       |
| 7.00       | 341   | 345   | 350   | 355   | 359   | 364   | 368   | 372   | 377   | 381   | 386   | 7.00       |
| 8.00       | 386   | 390   | 395   | 400   | 404   | 408   | 413   | 417   | 422   | 426   | 431   | 8.00       |
| 9.00       | 431   | 435   | 440   | 444   | 449   | 453   | 457   | 462   | 466   | 471   | 475   | 9.00       |
| 10.00      | 475   | 480   | 484   | 488   | 493   | 497   | 501   | 506   | 510   | 515   | 519   | 10.00      |
| 11.00      | 519   | 524   | 528   | 532   | 536   | 541   | 545   | 550   | 554   | 558   | 563   | 11.00      |
| 12.00      | 563   | 567   | 572   | 576   | 580   | 585   | 589   | 593   | 598   | 602   | 606   | 12.00      |
| 13.00      | 606   | 610   | 615   | 619   | 624   | 628   | 632   | 636   | 641   | 645   | 649   | 13.00      |
| 14.00      | 649   | 653   | 658   | 662   | 667   | 671   | 675   | 680   | 684   | 688   | 692   | 14.00      |
| 15.00      | 692   | 697   | 701   | 705   | 709   | 714   | 718   | 722   | 727   | 731   | 735   | 15.00      |
| 16.00      | 735   | 739   | 743   | 748   | 752   | 756   | 761   | 765   | 769   | 773   | 778   | 16.00      |
| 17.00      | 778   | 782   | 786   | 790   | 795   | 799   | 803   | 807   | 812   | 816   | 820   | 17.00      |
| 18.00      | 820   | 824   | 829   | 833   | 837   | 842   | 846   | 850   | 854   | 858   | 862   | 18.00      |
| 19.00      | 862   | 867   | 871   | 875   | 880   | 884   | 888   | 892   | 896   | 901   | 905   | 19.00      |
| 20.00      | 905   | 909   | 913   | 917   | 922   | 926   | 930   | 934   | 939   | 943   | 947   | 20.00      |
| 21.00      | 947   | 951   | 955   | 960   | 964   | 968   | 972   | 977   | 981   | 985   | 989   | 21.00      |
| 22.00      | 989   | 993   | 998   | 1,002 | 1,006 | 1,010 | 1,014 | 1,019 | 1,023 | 1,027 | 1,031 | 22.00      |
| 23.00      | 1,031 | 1,036 | 1,040 | 1,044 | 1,048 | 1,052 | 1,057 | 1,061 | 1,065 | 1,069 | 1,074 | 23.00      |
| 24.00      | 1,074 | 1,078 | 1,082 | 1,086 | 1,090 | 1,094 | 1,099 | 1,103 | 1,107 | 1,112 | 1,116 | 24.00      |
| 25.00      | 1,116 | 1,120 | 1,124 | 1,128 | 1,133 | 1,137 | 1,141 | 1,145 | 1,149 | 1,154 | 1,158 | 25.00      |
| 26.00      | 1,158 | 1,162 | 1,166 | 1,171 | 1,175 | 1,179 | 1,184 | 1,188 | 1,192 | 1,196 | 1,201 | 26.00      |
| 27.00      | 1,201 | 1,205 | 1,209 | 1,213 | 1,218 | 1,222 | 1,226 | 1,231 | 1,235 | 1,239 | 1,243 | 27.00      |
| 28.00      | 1,243 | 1,248 | 1,252 | 1,256 | 1,260 | 1,265 | 1,269 | 1,273 | 1,278 | 1,282 | 1,286 | 28.00      |
| 29.00      | 1,286 | 1,290 | 1,295 | 1,299 | 1,303 | 1,308 | 1,312 | 1,316 | 1,321 | 1,325 | 1,329 | 29.00      |
| 30.00      | 1,329 | 1,333 | 1,338 | 1,342 | 1,346 | 1,351 | 1,355 | 1,359 | 1,364 | 1,368 | 1,372 | 30.00      |
| Millivolts | .00   | .10   | .20   | .30   | .40   | .50   | .60   | .70   | .80   | .90   | 1.00  | Millivolts |

\*Based on the International Temperature Scale of 1948.



# Table 16. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperature in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .00   | .10   | .20   | .30   | .40   | .50   | .60   | .70   | .80   | .90   | 1.00  | Millivolts |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| Degrees F  |       |       |       |       |       |       |       |       |       |       |       |            |
| 30.00      | 1,329 | 1,333 | 1,338 | 1,342 | 1,346 | 1,351 | 1,355 | 1,359 | 1,364 | 1,368 | 1,372 | 30.00      |
| 31.00      | 1,372 | 1,376 | 1,381 | 1,385 | 1,389 | 1,394 | 1,398 | 1,402 | 1,407 | 1,411 | 1,415 | 31.00      |
| 32.00      | 1,415 | 1,420 | 1,424 | 1,428 | 1,433 | 1,437 | 1,441 | 1,446 | 1,450 | 1,454 | 1,459 | 32.00      |
| 33.00      | 1,459 | 1,463 | 1,468 | 1,472 | 1,476 | 1,481 | 1,485 | 1,490 | 1,494 | 1,499 | 1,503 | 33.00      |
| 34.00      | 1,503 | 1,507 | 1,512 | 1,516 | 1,520 | 1,525 | 1,529 | 1,534 | 1,538 | 1,543 | 1,547 | 34.00      |
| 35.00      | 1,547 | 1,551 | 1,556 | 1,560 | 1,565 | 1,569 | 1,573 | 1,578 | 1,582 | 1,587 | 1,591 | 35.00      |
| 36.00      | 1,591 | 1,596 | 1,600 | 1,605 | 1,609 | 1,614 | 1,618 | 1,623 | 1,627 | 1,632 | 1,636 | 36.00      |
| 37.00      | 1,636 | 1,641 | 1,645 | 1,650 | 1,654 | 1,659 | 1,663 | 1,667 | 1,672 | 1,676 | 1,681 | 37.00      |
| 38.00      | 1,681 | 1,685 | 1,690 | 1,694 | 1,699 | 1,703 | 1,708 | 1,712 | 1,717 | 1,721 | 1,726 | 38.00      |
| 39.00      | 1,726 | 1,731 | 1,735 | 1,740 | 1,744 | 1,749 | 1,753 | 1,758 | 1,762 | 1,767 | 1,772 | 39.00      |
| 40.00      | 1,772 | 1,776 | 1,781 | 1,785 | 1,790 | 1,794 | 1,799 | 1,804 | 1,808 | 1,813 | 1,818 | 40.00      |
| 41.00      | 1,818 | 1,822 | 1,827 | 1,832 | 1,836 | 1,841 | 1,845 | 1,850 | 1,854 | 1,859 | 1,864 | 41.00      |
| 42.00      | 1,864 | 1,868 | 1,873 | 1,877 | 1,882 | 1,887 | 1,892 | 1,896 | 1,901 | 1,906 | 1,911 | 42.00      |
| 43.00      | 1,911 | 1,915 | 1,920 | 1,924 | 1,929 | 1,934 | 1,938 | 1,943 | 1,948 | 1,952 | 1,957 | 43.00      |
| 44.00      | 1,957 | 1,962 | 1,967 | 1,971 | 1,976 | 1,981 | 1,985 | 1,990 | 1,995 | 2,000 | 2,004 | 44.00      |
| 45.00      | 2,004 | 2,009 | 2,014 | 2,019 | 2,023 | 2,028 | 2,033 | 2,038 | 2,042 | 2,047 | 2,052 | 45.00      |
| 46.00      | 2,052 | 2,057 | 2,062 | 2,066 | 2,071 | 2,076 | 2,081 | 2,086 | 2,090 | 2,095 | 2,100 | 46.00      |
| 47.00      | 2,100 | 2,105 | 2,110 | 2,115 | 2,120 | 2,124 | 2,129 | 2,134 | 2,139 | 2,144 | 2,149 | 47.00      |
| 48.00      | 2,149 | 2,154 | 2,158 | 2,163 | 2,168 | 2,173 | 2,178 | 2,183 | 2,188 | 2,192 | 2,197 | 48.00      |
| 49.00      | 2,197 | 2,202 | 2,207 | 2,212 | 2,217 | 2,222 | 2,227 | 2,232 | 2,237 | 2,242 | 2,247 | 49.00      |
| 50.00      | 2,247 | 2,252 | 2,257 | 2,262 | 2,267 | 2,272 | 2,277 | 2,282 | 2,287 | 2,292 | 2,297 | 50.00      |
| 51.00      | 2,297 | 2,302 | 2,307 | 2,313 | 2,318 | 2,323 | 2,328 | 2,333 | 2,338 | 2,343 | 2,348 | 51.00      |
| 52.00      | 2,348 | 2,354 | 2,359 | 2,364 | 2,369 | 2,374 | 2,379 | 2,384 | 2,390 | 2,395 | 2,400 | 52.00      |
| 53.00      | 2,400 | 2,405 | 2,410 | 2,415 | 2,420 | 2,426 | 2,431 | 2,436 | 2,441 | 2,446 | 2,452 | 53.00      |
| 54.00      | 2,452 | 2,457 | 2,462 | 2,467 | 2,473 | 2,478 | 2,483 | 2,489 | 2,494 | 2,499 | 2,505 | 54.00      |
| Millivolts | .00   | .10   | .20   | .30   | .40   | .50   | .60   | .70   | .80   | .90   | 1.00  | Millivolts |

\*Based on the International Temperature Scale of 1948.

# Table 17. Chromel-Alumel Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F        | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F  |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| Millivolts |       |       |       |       |       |       |       |       |       |       |       |      |
| -300       | -5.51 | -5.52 | -5.53 | -5.54 | -5.54 | -5.55 | -5.56 | -5.57 | -5.58 | -5.59 | -5.60 | -300 |
| -290       | -5.41 | -5.42 | -5.43 | -5.44 | -5.45 | -5.46 | -5.47 | -5.48 | -5.49 | -5.50 | -5.51 | -290 |
| -280       | -5.30 | -5.31 | -5.32 | -5.34 | -5.35 | -5.36 | -5.37 | -5.38 | -5.39 | -5.40 | -5.41 | -280 |
| -270       | -5.20 | -5.21 | -5.22 | -5.23 | -5.24 | -5.25 | -5.26 | -5.27 | -5.28 | -5.29 | -5.30 | -270 |
| -260       | -5.08 | -5.09 | -5.10 | -5.12 | -5.13 | -5.14 | -5.15 | -5.16 | -5.17 | -5.18 | -5.20 | -260 |
| -250       | -4.96 | -4.97 | -4.99 | -5.00 | -5.01 | -5.02 | -5.03 | -5.04 | -5.06 | -5.07 | -5.08 | -250 |
| -240       | -4.84 | -4.85 | -4.86 | -4.88 | -4.89 | -4.90 | -4.91 | -4.92 | -4.94 | -4.95 | -4.96 | -240 |
| -230       | -4.71 | -4.72 | -4.74 | -4.75 | -4.76 | -4.77 | -4.79 | -4.80 | -4.81 | -4.82 | -4.84 | -230 |
| -220       | -4.58 | -4.59 | -4.60 | -4.62 | -4.63 | -4.64 | -4.66 | -4.67 | -4.68 | -4.70 | -4.71 | -220 |
| -210       | -4.44 | -4.45 | -4.46 | -4.48 | -4.49 | -4.51 | -4.52 | -4.53 | -4.55 | -4.56 | -4.58 | -210 |
| -200       | -4.29 | -4.31 | -4.32 | -4.34 | -4.35 | -4.36 | -4.38 | -4.39 | -4.41 | -4.42 | -4.44 | -200 |
| -190       | -4.15 | -4.16 | -4.18 | -4.19 | -4.21 | -4.22 | -4.24 | -4.25 | -4.26 | -4.28 | -4.29 | -190 |
| -180       | -4.00 | -4.01 | -4.03 | -4.04 | -4.06 | -4.07 | -4.09 | -4.10 | -4.12 | -4.13 | -4.15 | -180 |
| -170       | -3.84 | -3.86 | -3.88 | -3.89 | -3.91 | -3.92 | -3.94 | -3.95 | -3.97 | -3.98 | -4.00 | -170 |
| -160       | -3.69 | -3.70 | -3.72 | -3.73 | -3.75 | -3.76 | -3.78 | -3.80 | -3.81 | -3.83 | -3.84 | -160 |
| -150       | -3.52 | -3.54 | -3.56 | -3.57 | -3.59 | -3.60 | -3.62 | -3.64 | -3.65 | -3.67 | -3.69 | -150 |
| -140       | -3.36 | -3.38 | -3.39 | -3.41 | -3.42 | -3.44 | -3.46 | -3.47 | -3.49 | -3.51 | -3.52 | -140 |
| -130       | -3.19 | -3.20 | -3.22 | -3.24 | -3.25 | -3.27 | -3.29 | -3.31 | -3.32 | -3.34 | -3.36 | -130 |
| -120       | -3.01 | -3.03 | -3.05 | -3.06 | -3.08 | -3.10 | -3.12 | -3.13 | -3.15 | -3.17 | -3.19 | -120 |
| -110       | -2.83 | -2.85 | -2.87 | -2.89 | -2.90 | -2.92 | -2.94 | -2.96 | -2.98 | -2.99 | -3.01 | -110 |
| -100       | -2.65 | -2.67 | -2.69 | -2.71 | -2.72 | -2.74 | -2.76 | -2.78 | -2.80 | -2.82 | -2.83 | -100 |
| -90        | -2.47 | -2.49 | -2.50 | -2.52 | -2.54 | -2.56 | -2.58 | -2.60 | -2.62 | -2.63 | -2.65 | -90  |
| -80        | -2.28 | -2.30 | -2.32 | -2.34 | -2.36 | -2.37 | -2.39 | -2.41 | -2.43 | -2.45 | -2.47 | -80  |
| -70        | -2.09 | -2.11 | -2.13 | -2.15 | -2.17 | -2.18 | -2.20 | -2.22 | -2.24 | -2.26 | -2.28 | -70  |
| -60        | -1.90 | -1.92 | -1.94 | -1.96 | -1.97 | -1.99 | -2.01 | -2.03 | -2.05 | -2.07 | -2.09 | -60  |
| -50        | -1.70 | -1.72 | -1.74 | -1.76 | -1.78 | -1.80 | -1.82 | -1.84 | -1.86 | -1.88 | -1.90 | -50  |
| -40        | -1.50 | -1.52 | -1.54 | -1.56 | -1.58 | -1.60 | -1.62 | -1.64 | -1.66 | -1.68 | -1.70 | -40  |
| -30        | -1.30 | -1.32 | -1.34 | -1.36 | -1.38 | -1.40 | -1.42 | -1.44 | -1.46 | -1.48 | -1.50 | -30  |
| -20        | -1.10 | -1.12 | -1.14 | -1.16 | -1.18 | -1.20 | -1.22 | -1.24 | -1.26 | -1.28 | -1.30 | -20  |
| -10        | -0.89 | -0.91 | -0.93 | -0.95 | -0.97 | -0.99 | -1.01 | -1.03 | -1.06 | -1.08 | -1.10 | -10  |
| (-)0       | -0.68 | -0.70 | -0.72 | -0.75 | -0.77 | -0.79 | -0.81 | -0.83 | -0.85 | -0.87 | -0.89 | (-)0 |
| (+)0       | -0.68 | -0.66 | -0.64 | -0.62 | -0.60 | -0.58 | -0.56 | -0.54 | -0.52 | -0.49 | -0.47 | (+)0 |
| 10         | -0.47 | -0.45 | -0.43 | -0.41 | -0.39 | -0.37 | -0.34 | -0.32 | -0.30 | -0.28 | -0.26 | 10   |
| 20         | -0.26 | -0.24 | -0.22 | -0.19 | -0.17 | -0.15 | -0.13 | -0.11 | -0.09 | -0.07 | -0.04 | 20   |
| 30         | -0.04 | -0.02 | 0.00  | 0.02  | 0.04  | 0.07  | 0.09  | 0.11  | 0.13  | 0.15  | 0.18  | 30   |
| 40         | 0.18  | 0.20  | 0.22  | 0.24  | 0.26  | 0.29  | 0.31  | 0.33  | 0.35  | 0.37  | 0.40  | 40   |
| 50         | 0.40  | 0.42  | 0.44  | 0.46  | 0.48  | 0.51  | 0.53  | 0.55  | 0.57  | 0.60  | 0.62  | 50   |
| 60         | 0.62  | 0.64  | 0.66  | 0.68  | 0.71  | 0.73  | 0.75  | 0.77  | 0.80  | 0.82  | 0.84  | 60   |
| 70         | 0.84  | 0.86  | 0.88  | 0.91  | 0.93  | 0.95  | 0.97  | 1.00  | 1.02  | 1.04  | 1.06  | 70   |
| 80         | 1.06  | 1.09  | 1.11  | 1.13  | 1.15  | 1.18  | 1.20  | 1.22  | 1.24  | 1.27  | 1.29  | 80   |
| 90         | 1.29  | 1.31  | 1.33  | 1.36  | 1.38  | 1.40  | 1.43  | 1.45  | 1.47  | 1.49  | 1.52  | 90   |
| 100        | 1.52  | 1.54  | 1.56  | 1.58  | 1.61  | 1.63  | 1.65  | 1.68  | 1.70  | 1.72  | 1.74  | 100  |
| ° F        | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F  |

\*Based on the International Temperature Scale of 1948.



# Table 17. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F |
|-----|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|     | Millivolts |       |       |       |       |       |       |       |       |       |       |     |
| 100 | 1.52       | 1.54  | 1.56  | 1.58  | 1.61  | 1.63  | 1.65  | 1.68  | 1.70  | 1.72  | 1.74  | 100 |
| 110 | 1.74       | 1.77  | 1.79  | 1.81  | 1.84  | 1.86  | 1.88  | 1.90  | 1.93  | 1.95  | 1.97  | 110 |
| 120 | 1.97       | 2.00  | 2.02  | 2.04  | 2.06  | 2.09  | 2.11  | 2.13  | 2.16  | 2.18  | 2.20  | 120 |
| 130 | 2.20       | 2.23  | 2.25  | 2.27  | 2.29  | 2.32  | 2.34  | 2.36  | 2.39  | 2.41  | 2.43  | 130 |
| 140 | 2.43       | 2.46  | 2.48  | 2.50  | 2.52  | 2.55  | 2.57  | 2.59  | 2.62  | 2.64  | 2.66  | 140 |
| 150 | 2.66       | 2.69  | 2.71  | 2.73  | 2.75  | 2.78  | 2.80  | 2.82  | 2.85  | 2.87  | 2.89  | 150 |
| 160 | 2.89       | 2.92  | 2.94  | 2.96  | 2.98  | 3.01  | 3.03  | 3.05  | 3.08  | 3.10  | 3.12  | 160 |
| 170 | 3.12       | 3.15  | 3.17  | 3.19  | 3.22  | 3.24  | 3.26  | 3.29  | 3.31  | 3.33  | 3.36  | 170 |
| 180 | 3.36       | 3.38  | 3.40  | 3.43  | 3.45  | 3.47  | 3.49  | 3.52  | 3.54  | 3.56  | 3.59  | 180 |
| 190 | 3.59       | 3.61  | 3.63  | 3.66  | 3.68  | 3.70  | 3.73  | 3.75  | 3.77  | 3.80  | 3.82  | 190 |
| 200 | 3.82       | 3.84  | 3.87  | 3.89  | 3.91  | 3.94  | 3.96  | 3.98  | 4.01  | 4.03  | 4.05  | 200 |
| 210 | 4.05       | 4.08  | 4.10  | 4.12  | 4.15  | 4.17  | 4.19  | 4.21  | 4.24  | 4.26  | 4.28  | 210 |
| 220 | 4.28       | 4.31  | 4.33  | 4.35  | 4.38  | 4.40  | 4.42  | 4.44  | 4.47  | 4.49  | 4.51  | 220 |
| 230 | 4.51       | 4.54  | 4.56  | 4.58  | 4.61  | 4.63  | 4.65  | 4.67  | 4.70  | 4.72  | 4.74  | 230 |
| 240 | 4.74       | 4.77  | 4.79  | 4.81  | 4.83  | 4.86  | 4.88  | 4.90  | 4.92  | 4.95  | 4.97  | 240 |
| 250 | 4.97       | 4.99  | 5.02  | 5.04  | 5.06  | 5.08  | 5.11  | 5.13  | 5.15  | 5.17  | 5.20  | 250 |
| 260 | 5.20       | 5.22  | 5.24  | 5.26  | 5.29  | 5.31  | 5.33  | 5.35  | 5.38  | 5.40  | 5.42  | 260 |
| 270 | 5.42       | 5.44  | 5.47  | 5.49  | 5.51  | 5.53  | 5.56  | 5.58  | 5.60  | 5.62  | 5.65  | 270 |
| 280 | 5.65       | 5.67  | 5.69  | 5.71  | 5.73  | 5.76  | 5.78  | 5.80  | 5.82  | 5.85  | 5.87  | 280 |
| 290 | 5.87       | 5.89  | 5.91  | 5.93  | 5.96  | 5.98  | 6.00  | 6.02  | 6.05  | 6.07  | 6.09  | 290 |
| 300 | 6.09       | 6.11  | 6.13  | 6.16  | 6.18  | 6.20  | 6.22  | 6.25  | 6.27  | 6.29  | 6.31  | 300 |
| 310 | 6.31       | 6.33  | 6.36  | 6.38  | 6.40  | 6.42  | 6.45  | 6.47  | 6.49  | 6.51  | 6.53  | 310 |
| 320 | 6.53       | 6.56  | 6.58  | 6.60  | 6.62  | 6.65  | 6.67  | 6.69  | 6.71  | 6.73  | 6.76  | 320 |
| 330 | 6.76       | 6.78  | 6.80  | 6.82  | 6.84  | 6.87  | 6.89  | 6.91  | 6.93  | 6.96  | 6.98  | 330 |
| 340 | 6.98       | 7.00  | 7.02  | 7.04  | 7.07  | 7.09  | 7.11  | 7.13  | 7.15  | 7.18  | 7.20  | 340 |
| 350 | 7.20       | 7.22  | 7.24  | 7.26  | 7.29  | 7.31  | 7.33  | 7.35  | 7.38  | 7.40  | 7.42  | 350 |
| 360 | 7.42       | 7.44  | 7.46  | 7.49  | 7.51  | 7.53  | 7.55  | 7.58  | 7.60  | 7.62  | 7.64  | 360 |
| 370 | 7.64       | 7.66  | 7.69  | 7.71  | 7.73  | 7.75  | 7.78  | 7.80  | 7.82  | 7.84  | 7.87  | 370 |
| 380 | 7.87       | 7.89  | 7.91  | 7.93  | 7.95  | 7.98  | 8.00  | 8.02  | 8.04  | 8.07  | 8.09  | 380 |
| 390 | 8.09       | 8.11  | 8.13  | 8.16  | 8.18  | 8.20  | 8.22  | 8.24  | 8.27  | 8.29  | 8.31  | 390 |
| 400 | 8.31       | 8.33  | 8.36  | 8.38  | 8.40  | 8.42  | 8.45  | 8.47  | 8.49  | 8.51  | 8.54  | 400 |
| 410 | 8.54       | 8.56  | 8.58  | 8.60  | 8.62  | 8.65  | 8.67  | 8.69  | 8.71  | 8.74  | 8.76  | 410 |
| 420 | 8.76       | 8.78  | 8.80  | 8.82  | 8.85  | 8.87  | 8.89  | 8.91  | 8.94  | 8.96  | 8.98  | 420 |
| 430 | 8.98       | 9.00  | 9.03  | 9.05  | 9.07  | 9.09  | 9.12  | 9.14  | 9.16  | 9.18  | 9.21  | 430 |
| 440 | 9.21       | 9.23  | 9.25  | 9.27  | 9.30  | 9.32  | 9.34  | 9.36  | 9.39  | 9.41  | 9.43  | 440 |
| 450 | 9.43       | 9.45  | 9.48  | 9.50  | 9.52  | 9.54  | 9.57  | 9.59  | 9.61  | 9.63  | 9.66  | 450 |
| 460 | 9.66       | 9.68  | 9.70  | 9.73  | 9.75  | 9.77  | 9.79  | 9.82  | 9.84  | 9.86  | 9.88  | 460 |
| 470 | 9.88       | 9.91  | 9.93  | 9.95  | 9.97  | 10.00 | 10.02 | 10.04 | 10.06 | 10.09 | 10.11 | 470 |
| 480 | 10.11      | 10.13 | 10.16 | 10.18 | 10.20 | 10.22 | 10.25 | 10.27 | 10.29 | 10.31 | 10.34 | 480 |
| 490 | 10.34      | 10.36 | 10.38 | 10.40 | 10.43 | 10.45 | 10.47 | 10.50 | 10.52 | 10.54 | 10.57 | 490 |
| 500 | 10.57      | 10.59 | 10.61 | 10.63 | 10.66 | 10.68 | 10.70 | 10.72 | 10.75 | 10.77 | 10.79 | 500 |
| ° F | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F |

\*Based on the International Temperature Scale of 1948.

# Table 17. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F        | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| Millivolts |       |       |       |       |       |       |       |       |       |       |       |     |
| 500        | 10.57 | 10.59 | 10.61 | 10.63 | 10.66 | 10.68 | 10.70 | 10.72 | 10.75 | 10.77 | 10.79 | 500 |
| 510        | 10.79 | 10.82 | 10.84 | 10.86 | 10.88 | 10.91 | 10.93 | 10.95 | 10.98 | 11.00 | 11.02 | 510 |
| 520        | 11.02 | 11.04 | 11.07 | 11.09 | 11.11 | 11.13 | 11.16 | 11.18 | 11.20 | 11.23 | 11.25 | 520 |
| 530        | 11.25 | 11.27 | 11.29 | 11.32 | 11.34 | 11.36 | 11.39 | 11.41 | 11.43 | 11.45 | 11.48 | 530 |
| 540        | 11.48 | 11.50 | 11.52 | 11.55 | 11.57 | 11.59 | 11.61 | 11.64 | 11.66 | 11.68 | 11.71 | 540 |
| 550        | 11.71 | 11.73 | 11.75 | 11.78 | 11.80 | 11.82 | 11.84 | 11.87 | 11.89 | 11.91 | 11.94 | 550 |
| 560        | 11.94 | 11.96 | 11.98 | 12.01 | 12.03 | 12.05 | 12.07 | 12.10 | 12.12 | 12.14 | 12.17 | 560 |
| 570        | 12.17 | 12.19 | 12.21 | 12.24 | 12.26 | 12.28 | 12.30 | 12.33 | 12.35 | 12.37 | 12.40 | 570 |
| 580        | 12.40 | 12.42 | 12.44 | 12.47 | 12.49 | 12.51 | 12.53 | 12.56 | 12.58 | 12.60 | 12.63 | 580 |
| 590        | 12.63 | 12.65 | 12.67 | 12.70 | 12.72 | 12.74 | 12.76 | 12.79 | 12.81 | 12.83 | 12.86 | 590 |
| 600        | 12.86 | 12.88 | 12.90 | 12.93 | 12.95 | 12.97 | 13.00 | 13.02 | 13.04 | 13.06 | 13.09 | 600 |
| 610        | 13.09 | 13.11 | 13.13 | 13.16 | 13.18 | 13.20 | 13.23 | 13.25 | 13.27 | 13.30 | 13.32 | 610 |
| 620        | 13.32 | 13.34 | 13.36 | 13.39 | 13.41 | 13.44 | 13.46 | 13.48 | 13.50 | 13.53 | 13.55 | 620 |
| 630        | 13.55 | 13.57 | 13.60 | 13.62 | 13.64 | 13.67 | 13.69 | 13.71 | 13.74 | 13.76 | 13.78 | 630 |
| 640        | 13.78 | 13.81 | 13.83 | 13.85 | 13.88 | 13.90 | 13.92 | 13.95 | 13.97 | 13.99 | 14.02 | 640 |
| 650        | 14.02 | 14.04 | 14.06 | 14.09 | 14.11 | 14.13 | 14.15 | 14.18 | 14.20 | 14.22 | 14.25 | 650 |
| 660        | 14.25 | 14.27 | 14.29 | 14.32 | 14.34 | 14.36 | 14.39 | 14.41 | 14.43 | 14.46 | 14.48 | 660 |
| 670        | 14.48 | 14.50 | 14.53 | 14.55 | 14.57 | 14.60 | 14.62 | 14.64 | 14.67 | 14.69 | 14.71 | 670 |
| 680        | 14.71 | 14.74 | 14.76 | 14.78 | 14.81 | 14.83 | 14.85 | 14.88 | 14.90 | 14.92 | 14.95 | 680 |
| 690        | 14.95 | 14.97 | 14.99 | 15.02 | 15.04 | 15.06 | 15.09 | 15.11 | 15.13 | 15.16 | 15.18 | 690 |
| 700        | 15.18 | 15.20 | 15.23 | 15.25 | 15.27 | 15.30 | 15.32 | 15.34 | 15.37 | 15.39 | 15.41 | 700 |
| 710        | 15.41 | 15.44 | 15.46 | 15.48 | 15.51 | 15.53 | 15.55 | 15.58 | 15.60 | 15.62 | 15.65 | 710 |
| 720        | 15.65 | 15.67 | 15.69 | 15.72 | 15.74 | 15.76 | 15.79 | 15.81 | 15.83 | 15.86 | 15.88 | 720 |
| 730        | 15.88 | 15.90 | 15.93 | 15.95 | 15.98 | 16.00 | 16.02 | 16.05 | 16.07 | 16.09 | 16.12 | 730 |
| 740        | 16.12 | 16.14 | 16.16 | 16.19 | 16.21 | 16.23 | 16.26 | 16.28 | 16.30 | 16.33 | 16.35 | 740 |
| 750        | 16.35 | 16.37 | 16.40 | 16.42 | 16.45 | 16.47 | 16.49 | 16.52 | 16.54 | 16.56 | 16.59 | 750 |
| 760        | 16.59 | 16.61 | 16.63 | 16.66 | 16.68 | 16.70 | 16.73 | 16.75 | 16.77 | 16.80 | 16.82 | 760 |
| 770        | 16.82 | 16.84 | 16.87 | 16.89 | 16.92 | 16.94 | 16.96 | 16.99 | 17.01 | 17.03 | 17.06 | 770 |
| 780        | 17.06 | 17.08 | 17.10 | 17.13 | 17.15 | 17.17 | 17.20 | 17.22 | 17.24 | 17.27 | 17.29 | 780 |
| 790        | 17.29 | 17.31 | 17.34 | 17.36 | 17.39 | 17.41 | 17.43 | 17.46 | 17.48 | 17.50 | 17.53 | 790 |
| 800        | 17.53 | 17.55 | 17.57 | 17.60 | 17.62 | 17.64 | 17.67 | 17.69 | 17.71 | 17.74 | 17.76 | 800 |
| 810        | 17.76 | 17.78 | 17.81 | 17.83 | 17.86 | 17.88 | 17.90 | 17.93 | 17.95 | 17.97 | 18.00 | 810 |
| 820        | 18.00 | 18.02 | 18.04 | 18.07 | 18.09 | 18.11 | 18.14 | 18.16 | 18.18 | 18.21 | 18.23 | 820 |
| 830        | 18.23 | 18.25 | 18.28 | 18.30 | 18.33 | 18.35 | 18.37 | 18.40 | 18.42 | 18.44 | 18.47 | 830 |
| 840        | 18.47 | 18.49 | 18.51 | 18.54 | 18.56 | 18.58 | 18.61 | 18.63 | 18.65 | 18.68 | 18.70 | 840 |
| 850        | 18.70 | 18.73 | 18.75 | 18.77 | 18.80 | 18.82 | 18.84 | 18.87 | 18.89 | 18.91 | 18.94 | 850 |
| 860        | 18.94 | 18.96 | 18.99 | 19.01 | 19.03 | 19.06 | 19.08 | 19.10 | 19.13 | 19.15 | 19.18 | 860 |
| 870        | 19.18 | 19.20 | 19.22 | 19.25 | 19.27 | 19.29 | 19.32 | 19.34 | 19.36 | 19.39 | 19.41 | 870 |
| 880        | 19.41 | 19.44 | 19.46 | 19.48 | 19.51 | 19.53 | 19.55 | 19.58 | 19.60 | 19.63 | 19.65 | 880 |
| 890        | 19.65 | 19.67 | 19.70 | 19.72 | 19.75 | 19.77 | 19.79 | 19.82 | 19.84 | 19.86 | 19.89 | 890 |
| 900        | 19.89 | 19.91 | 19.94 | 19.96 | 19.98 | 20.01 | 20.03 | 20.05 | 20.08 | 20.10 | 20.13 | 900 |
| ° F        | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F |

\*Based on the International Temperature Scale of 1948.



# Table 17. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F   | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F   |
|-------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|       | Millivolts |       |       |       |       |       |       |       |       |       |       |       |
| 900   | 19.89      | 19.91 | 19.94 | 19.96 | 19.98 | 20.01 | 20.03 | 20.05 | 20.08 | 20.10 | 20.13 | 900   |
| 910   | 20.13      | 20.15 | 20.17 | 20.20 | 20.22 | 20.24 | 20.27 | 20.29 | 20.32 | 20.34 | 20.36 | 910   |
| 920   | 20.36      | 20.39 | 20.41 | 20.43 | 20.46 | 20.48 | 20.50 | 20.53 | 20.55 | 20.58 | 20.60 | 920   |
| 930   | 20.60      | 20.62 | 20.65 | 20.67 | 20.69 | 20.72 | 20.74 | 20.76 | 20.79 | 20.81 | 20.84 | 930   |
| 940   | 20.84      | 20.86 | 20.88 | 20.91 | 20.93 | 20.95 | 20.98 | 21.00 | 21.03 | 21.05 | 21.07 | 940   |
| 950   | 21.07      | 21.10 | 21.12 | 21.14 | 21.17 | 21.19 | 21.21 | 21.24 | 21.26 | 21.28 | 21.31 | 950   |
| 960   | 21.31      | 21.33 | 21.36 | 21.38 | 21.40 | 21.43 | 21.45 | 21.47 | 21.50 | 21.52 | 21.54 | 960   |
| 970   | 21.54      | 21.57 | 21.59 | 21.62 | 21.64 | 21.66 | 21.69 | 21.71 | 21.73 | 21.76 | 21.78 | 970   |
| 980   | 21.78      | 21.81 | 21.83 | 21.85 | 21.88 | 21.90 | 21.92 | 21.95 | 21.97 | 21.99 | 22.02 | 980   |
| 990   | 22.02      | 22.04 | 22.07 | 22.09 | 22.11 | 22.14 | 22.16 | 22.18 | 22.21 | 22.23 | 22.26 | 990   |
| 1,000 | 22.26      | 22.28 | 22.30 | 22.33 | 22.35 | 22.37 | 22.40 | 22.42 | 22.44 | 22.47 | 22.49 | 1,000 |
| 1,010 | 22.49      | 22.52 | 22.54 | 22.56 | 22.59 | 22.61 | 22.63 | 22.66 | 22.68 | 22.71 | 22.73 | 1,010 |
| 1,020 | 22.73      | 22.75 | 22.78 | 22.80 | 22.82 | 22.85 | 22.87 | 22.90 | 22.92 | 22.94 | 22.97 | 1,020 |
| 1,030 | 22.97      | 22.99 | 23.01 | 23.04 | 23.06 | 23.08 | 23.11 | 23.13 | 23.16 | 23.18 | 23.20 | 1,030 |
| 1,040 | 23.20      | 23.23 | 23.25 | 23.27 | 23.30 | 23.32 | 23.35 | 23.37 | 23.39 | 23.42 | 23.44 | 1,040 |
| 1,050 | 23.44      | 23.46 | 23.49 | 23.51 | 23.54 | 23.56 | 23.58 | 23.61 | 23.63 | 23.65 | 23.68 | 1,050 |
| 1,060 | 23.68      | 23.70 | 23.72 | 23.75 | 23.77 | 23.80 | 23.82 | 23.84 | 23.87 | 23.89 | 23.91 | 1,060 |
| 1,070 | 23.91      | 23.94 | 23.96 | 23.99 | 24.01 | 24.03 | 24.06 | 24.08 | 24.10 | 24.13 | 24.15 | 1,070 |
| 1,080 | 24.15      | 24.18 | 24.20 | 24.22 | 24.25 | 24.27 | 24.29 | 24.32 | 24.34 | 24.36 | 24.39 | 1,080 |
| 1,090 | 24.39      | 24.41 | 24.44 | 24.46 | 24.49 | 24.51 | 24.53 | 24.55 | 24.58 | 24.60 | 24.63 | 1,090 |
| 1,100 | 24.63      | 24.65 | 24.67 | 24.70 | 24.72 | 24.74 | 24.77 | 24.79 | 24.82 | 24.84 | 24.86 | 1,100 |
| 1,110 | 24.86      | 24.89 | 24.91 | 24.93 | 24.96 | 24.98 | 25.01 | 25.03 | 25.05 | 25.08 | 25.10 | 1,110 |
| 1,120 | 25.10      | 25.12 | 25.15 | 25.17 | 25.20 | 25.22 | 25.24 | 25.27 | 25.29 | 25.31 | 25.34 | 1,120 |
| 1,130 | 25.34      | 25.36 | 25.38 | 25.41 | 25.43 | 25.46 | 25.48 | 25.50 | 25.53 | 25.55 | 25.57 | 1,130 |
| 1,140 | 25.57      | 25.60 | 25.62 | 25.65 | 25.67 | 25.69 | 25.72 | 25.74 | 25.76 | 25.79 | 25.81 | 1,140 |
| 1,150 | 25.81      | 25.83 | 25.86 | 25.88 | 25.91 | 25.93 | 25.95 | 25.98 | 26.00 | 26.02 | 26.05 | 1,150 |
| 1,160 | 26.05      | 26.07 | 26.09 | 26.12 | 26.14 | 26.16 | 26.19 | 26.21 | 26.24 | 26.26 | 26.28 | 1,160 |
| 1,170 | 26.28      | 26.31 | 26.33 | 26.35 | 26.38 | 26.40 | 26.42 | 26.45 | 26.47 | 26.49 | 26.52 | 1,170 |
| 1,180 | 26.52      | 26.54 | 26.56 | 26.59 | 26.61 | 26.63 | 26.66 | 26.68 | 26.70 | 26.73 | 26.75 | 1,180 |
| 1,190 | 26.75      | 26.77 | 26.80 | 26.82 | 26.85 | 26.87 | 26.89 | 26.91 | 26.94 | 26.96 | 26.98 | 1,190 |
| 1,200 | 26.98      | 27.01 | 27.03 | 27.06 | 27.08 | 27.10 | 27.12 | 27.15 | 27.17 | 27.20 | 27.22 | 1,200 |
| 1,210 | 27.22      | 27.24 | 27.27 | 27.29 | 27.31 | 27.34 | 27.36 | 27.38 | 27.40 | 27.43 | 27.45 | 1,210 |
| 1,220 | 27.45      | 27.48 | 27.50 | 27.52 | 27.55 | 27.57 | 27.59 | 27.62 | 27.64 | 27.66 | 27.69 | 1,220 |
| 1,230 | 27.69      | 27.71 | 27.73 | 27.76 | 27.78 | 27.80 | 27.83 | 27.85 | 27.87 | 27.90 | 27.92 | 1,230 |
| 1,240 | 27.92      | 27.94 | 27.97 | 27.99 | 28.01 | 28.04 | 28.06 | 28.08 | 28.11 | 28.13 | 28.15 | 1,240 |
| 1,250 | 28.15      | 28.18 | 28.20 | 28.22 | 28.25 | 28.27 | 28.29 | 28.32 | 28.34 | 28.37 | 28.39 | 1,250 |
| 1,260 | 28.39      | 28.41 | 28.44 | 28.46 | 28.48 | 28.50 | 28.53 | 28.55 | 28.58 | 28.60 | 28.62 | 1,260 |
| 1,270 | 28.62      | 28.65 | 28.67 | 28.69 | 28.72 | 28.74 | 28.76 | 28.79 | 28.81 | 28.83 | 28.86 | 1,270 |
| 1,280 | 28.86      | 28.88 | 28.90 | 28.93 | 28.95 | 28.97 | 29.00 | 29.02 | 29.04 | 29.07 | 29.09 | 1,280 |
| 1,290 | 29.09      | 29.11 | 29.14 | 29.16 | 29.18 | 29.21 | 29.23 | 29.25 | 29.28 | 29.30 | 29.32 | 1,290 |
| 1,300 | 29.32      | 29.35 | 29.37 | 29.39 | 29.42 | 29.44 | 29.46 | 29.49 | 29.51 | 29.53 | 29.56 | 1,300 |
| ° F   | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F   |

\*Based on the International Temperature Scale of 1948.

# Table 17. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperature in Degrees F.\* Reference Junctions at 32° F.)

| ° F   | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F   |
|-------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|       | Millivolts |       |       |       |       |       |       |       |       |       |       |       |
| 1,300 | 29.32      | 29.35 | 29.37 | 29.39 | 29.42 | 29.44 | 29.46 | 29.49 | 29.51 | 29.53 | 29.56 | 1,300 |
| 1,310 | 29.56      | 29.58 | 29.60 | 29.63 | 29.65 | 29.67 | 29.70 | 29.72 | 29.74 | 29.77 | 29.79 | 1,310 |
| 1,320 | 29.79      | 29.81 | 29.84 | 29.86 | 29.88 | 29.91 | 29.93 | 29.95 | 29.97 | 30.00 | 30.02 | 1,320 |
| 1,330 | 30.02      | 30.05 | 30.07 | 30.09 | 30.11 | 30.14 | 30.16 | 30.18 | 30.21 | 30.23 | 30.25 | 1,330 |
| 1,340 | 30.25      | 30.28 | 30.30 | 30.32 | 30.35 | 30.37 | 30.39 | 30.42 | 30.44 | 30.46 | 30.49 | 1,340 |
| 1,350 | 30.49      | 30.51 | 30.53 | 30.56 | 30.58 | 30.60 | 30.63 | 30.65 | 30.67 | 30.70 | 30.72 | 1,350 |
| 1,360 | 30.72      | 30.74 | 30.77 | 30.79 | 30.81 | 30.83 | 30.86 | 30.88 | 30.90 | 30.93 | 30.95 | 1,360 |
| 1,370 | 30.95      | 30.97 | 31.00 | 31.02 | 31.04 | 31.07 | 31.09 | 31.11 | 31.14 | 31.16 | 31.18 | 1,370 |
| 1,380 | 31.18      | 31.21 | 31.23 | 31.25 | 31.28 | 31.30 | 31.32 | 31.34 | 31.37 | 31.39 | 31.42 | 1,380 |
| 1,390 | 31.42      | 31.44 | 31.46 | 31.48 | 31.51 | 31.53 | 31.55 | 31.58 | 31.60 | 31.62 | 31.65 | 1,390 |
| 1,400 | 31.65      | 31.67 | 31.69 | 31.72 | 31.74 | 31.76 | 31.78 | 31.81 | 31.83 | 31.85 | 31.88 | 1,400 |
| 1,410 | 31.88      | 31.90 | 31.92 | 31.95 | 31.97 | 31.99 | 32.02 | 32.04 | 32.06 | 32.08 | 32.11 | 1,410 |
| 1,420 | 32.11      | 32.13 | 32.15 | 32.18 | 32.20 | 32.22 | 32.25 | 32.27 | 32.29 | 32.31 | 32.34 | 1,420 |
| 1,430 | 32.34      | 32.36 | 32.38 | 32.41 | 32.43 | 32.45 | 32.48 | 32.50 | 32.52 | 32.54 | 32.57 | 1,430 |
| 1,440 | 32.57      | 32.59 | 32.61 | 32.64 | 32.66 | 32.68 | 32.70 | 32.73 | 32.75 | 32.77 | 32.80 | 1,440 |
| 1,450 | 32.80      | 32.82 | 32.84 | 32.86 | 32.89 | 32.91 | 32.93 | 32.96 | 32.98 | 33.00 | 33.02 | 1,450 |
| 1,460 | 33.02      | 33.05 | 33.07 | 33.09 | 33.12 | 33.14 | 33.16 | 33.18 | 33.21 | 33.23 | 33.25 | 1,460 |
| 1,470 | 33.25      | 33.28 | 33.30 | 33.32 | 33.34 | 33.37 | 33.39 | 33.41 | 33.43 | 33.46 | 33.48 | 1,470 |
| 1,480 | 33.48      | 33.50 | 33.53 | 33.55 | 33.57 | 33.59 | 33.62 | 33.64 | 33.66 | 33.69 | 33.71 | 1,480 |
| 1,490 | 33.71      | 33.73 | 33.75 | 33.78 | 33.80 | 33.82 | 33.84 | 33.87 | 33.89 | 33.91 | 33.93 | 1,490 |
| 1,500 | 33.93      | 33.96 | 33.98 | 34.00 | 34.03 | 34.05 | 34.07 | 34.09 | 34.12 | 34.14 | 34.16 | 1,500 |
| 1,510 | 34.16      | 34.18 | 34.21 | 34.23 | 34.25 | 34.28 | 34.30 | 34.32 | 34.34 | 34.37 | 34.39 | 1,510 |
| 1,520 | 34.39      | 34.41 | 34.43 | 34.46 | 34.48 | 34.50 | 34.53 | 34.55 | 34.57 | 34.59 | 34.62 | 1,520 |
| 1,530 | 34.62      | 34.64 | 34.66 | 34.68 | 34.71 | 34.73 | 34.75 | 34.77 | 34.80 | 34.82 | 34.84 | 1,530 |
| 1,540 | 34.84      | 34.87 | 34.89 | 34.91 | 34.93 | 34.96 | 34.98 | 35.00 | 35.02 | 35.05 | 35.07 | 1,540 |
| 1,550 | 35.07      | 35.09 | 35.11 | 35.14 | 35.16 | 35.18 | 35.21 | 35.23 | 35.25 | 35.27 | 35.29 | 1,550 |
| 1,560 | 35.29      | 35.32 | 35.34 | 35.36 | 35.39 | 35.41 | 35.43 | 35.45 | 35.48 | 35.50 | 35.52 | 1,560 |
| 1,570 | 35.52      | 35.54 | 35.57 | 35.59 | 35.61 | 35.63 | 35.66 | 35.68 | 35.70 | 35.72 | 35.75 | 1,570 |
| 1,580 | 35.75      | 35.77 | 35.79 | 35.81 | 35.84 | 35.86 | 35.88 | 35.90 | 35.93 | 35.95 | 35.97 | 1,580 |
| 1,590 | 35.97      | 35.99 | 36.02 | 36.04 | 36.06 | 36.08 | 36.11 | 36.13 | 36.15 | 36.17 | 36.19 | 1,590 |
| 1,600 | 36.19      | 36.22 | 36.24 | 36.26 | 36.29 | 36.31 | 36.33 | 36.35 | 36.37 | 36.40 | 36.42 | 1,600 |
| 1,610 | 36.42      | 36.44 | 36.46 | 36.49 | 36.51 | 36.53 | 36.55 | 36.58 | 36.60 | 36.62 | 36.64 | 1,610 |
| 1,620 | 36.64      | 36.67 | 36.69 | 36.71 | 36.73 | 36.76 | 36.78 | 36.80 | 36.82 | 36.84 | 36.87 | 1,620 |
| 1,630 | 36.87      | 36.89 | 36.91 | 36.93 | 36.96 | 36.98 | 37.00 | 37.02 | 37.05 | 37.07 | 37.09 | 1,630 |
| 1,640 | 37.09      | 37.11 | 37.14 | 37.16 | 37.18 | 37.20 | 37.23 | 37.25 | 37.27 | 37.29 | 37.31 | 1,640 |
| 1,650 | 37.31      | 37.34 | 37.36 | 37.38 | 37.40 | 37.43 | 37.45 | 37.47 | 37.49 | 37.52 | 37.54 | 1,650 |
| 1,660 | 37.54      | 37.56 | 37.58 | 37.60 | 37.63 | 37.65 | 37.67 | 37.69 | 37.72 | 37.74 | 37.76 | 1,660 |
| 1,670 | 37.76      | 37.78 | 37.81 | 37.83 | 37.85 | 37.87 | 37.89 | 37.92 | 37.94 | 37.96 | 37.98 | 1,670 |
| 1,680 | 37.98      | 38.01 | 38.03 | 38.05 | 38.07 | 38.09 | 38.12 | 38.14 | 38.16 | 38.18 | 38.20 | 1,680 |
| 1,690 | 38.20      | 38.23 | 38.25 | 38.27 | 38.29 | 38.32 | 38.34 | 38.36 | 38.38 | 38.40 | 38.43 | 1,690 |
| 1,700 | 38.43      | 38.45 | 38.47 | 38.49 | 38.51 | 38.54 | 38.56 | 38.58 | 38.60 | 38.62 | 38.65 | 1,700 |
| ° F   | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F   |

\*Based on the International Temperature Scale of 1948.



# Table 17. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F    | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F    |
|--------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
|        | Millivolts |       |       |       |       |       |       |       |       |       |       |        |
| 1, 700 | 38.43      | 38.45 | 38.47 | 38.49 | 38.51 | 38.54 | 38.56 | 38.58 | 38.60 | 38.62 | 38.65 | 1, 700 |
| 1, 710 | 38.65      | 38.67 | 38.69 | 38.71 | 38.73 | 38.76 | 38.78 | 38.80 | 38.82 | 38.84 | 38.87 | 1, 710 |
| 1, 720 | 38.87      | 38.89 | 38.91 | 38.93 | 38.95 | 38.98 | 39.00 | 39.02 | 39.04 | 39.06 | 39.09 | 1, 720 |
| 1, 730 | 39.09      | 39.11 | 39.13 | 39.15 | 39.17 | 39.20 | 39.22 | 39.24 | 39.26 | 39.28 | 39.31 | 1, 730 |
| 1, 740 | 39.31      | 39.33 | 39.35 | 39.37 | 39.39 | 39.42 | 39.44 | 39.46 | 39.48 | 39.50 | 39.53 | 1, 740 |
| 1, 750 | 39.53      | 39.55 | 39.57 | 39.59 | 39.61 | 39.64 | 39.66 | 39.68 | 39.70 | 39.72 | 39.75 | 1, 750 |
| 1, 760 | 39.75      | 39.77 | 39.79 | 39.81 | 39.83 | 39.86 | 39.88 | 39.90 | 39.92 | 39.94 | 39.96 | 1, 760 |
| 1, 770 | 39.96      | 39.99 | 40.01 | 40.03 | 40.05 | 40.07 | 40.10 | 40.12 | 40.14 | 40.16 | 40.18 | 1, 770 |
| 1, 780 | 40.18      | 40.20 | 40.23 | 40.25 | 40.27 | 40.29 | 40.31 | 40.34 | 40.36 | 40.38 | 40.40 | 1, 780 |
| 1, 790 | 40.40      | 40.42 | 40.44 | 40.47 | 40.49 | 40.51 | 40.53 | 40.55 | 40.58 | 40.60 | 40.62 | 1, 790 |
| 1, 800 | 40.62      | 40.64 | 40.66 | 40.68 | 40.71 | 40.73 | 40.75 | 40.77 | 40.79 | 40.82 | 40.84 | 1, 800 |
| 1, 810 | 40.84      | 40.86 | 40.88 | 40.90 | 40.92 | 40.95 | 40.97 | 40.99 | 41.01 | 41.03 | 41.05 | 1, 810 |
| 1, 820 | 41.05      | 41.08 | 41.10 | 41.12 | 41.14 | 41.16 | 41.18 | 41.21 | 41.23 | 41.25 | 41.27 | 1, 820 |
| 1, 830 | 41.27      | 41.29 | 41.31 | 41.34 | 41.36 | 41.38 | 41.40 | 41.42 | 41.45 | 41.47 | 41.49 | 1, 830 |
| 1, 840 | 41.49      | 41.51 | 41.53 | 41.55 | 41.57 | 41.60 | 41.62 | 41.64 | 41.66 | 41.68 | 41.70 | 1, 840 |
| 1, 850 | 41.70      | 41.73 | 41.75 | 41.77 | 41.79 | 41.81 | 41.83 | 41.85 | 41.88 | 41.90 | 41.92 | 1, 850 |
| 1, 860 | 41.92      | 41.94 | 41.96 | 41.99 | 42.01 | 42.03 | 42.05 | 42.07 | 42.09 | 42.11 | 42.14 | 1, 860 |
| 1, 870 | 42.14      | 42.16 | 42.18 | 42.20 | 42.22 | 42.24 | 42.26 | 42.29 | 42.31 | 42.33 | 42.35 | 1, 870 |
| 1, 880 | 42.35      | 42.37 | 42.39 | 42.42 | 42.44 | 42.46 | 42.48 | 42.50 | 42.52 | 42.55 | 42.57 | 1, 880 |
| 1, 890 | 42.57      | 42.59 | 42.61 | 42.63 | 42.65 | 42.67 | 42.69 | 42.72 | 42.74 | 42.76 | 42.78 | 1, 890 |
| 1, 900 | 42.78      | 42.80 | 42.82 | 42.84 | 42.87 | 42.89 | 42.91 | 42.93 | 42.95 | 42.97 | 42.99 | 1, 900 |
| 1, 910 | 42.99      | 43.01 | 43.04 | 43.06 | 43.08 | 43.10 | 43.12 | 43.14 | 43.17 | 43.19 | 43.21 | 1, 910 |
| 1, 920 | 43.21      | 43.23 | 43.25 | 43.27 | 43.29 | 43.31 | 43.34 | 43.36 | 43.38 | 43.40 | 43.42 | 1, 920 |
| 1, 930 | 43.42      | 43.44 | 43.47 | 43.49 | 43.51 | 43.53 | 43.55 | 43.57 | 43.59 | 43.61 | 43.63 | 1, 930 |
| 1, 940 | 43.63      | 43.66 | 43.68 | 43.70 | 43.72 | 43.74 | 43.76 | 43.78 | 43.81 | 43.83 | 43.85 | 1, 940 |
| 1, 950 | 43.85      | 43.87 | 43.89 | 43.91 | 43.93 | 43.95 | 43.98 | 44.00 | 44.02 | 44.04 | 44.06 | 1, 950 |
| 1, 960 | 44.06      | 44.08 | 44.10 | 44.13 | 44.15 | 44.17 | 44.19 | 44.21 | 44.23 | 44.25 | 44.27 | 1, 960 |
| 1, 970 | 44.27      | 44.30 | 44.32 | 44.34 | 44.36 | 44.38 | 44.40 | 44.42 | 44.44 | 44.47 | 44.49 | 1, 970 |
| 1, 980 | 44.49      | 44.51 | 44.53 | 44.55 | 44.57 | 44.59 | 44.61 | 44.63 | 44.66 | 44.68 | 44.70 | 1, 980 |
| 1, 990 | 44.70      | 44.72 | 44.74 | 44.76 | 44.78 | 44.80 | 44.82 | 44.85 | 44.87 | 44.89 | 44.91 | 1, 990 |
| 2, 000 | 44.91      | 44.93 | 44.95 | 44.97 | 44.99 | 45.01 | 45.03 | 45.06 | 45.08 | 45.10 | 45.12 | 2, 000 |
| 2, 010 | 45.12      | 45.14 | 45.16 | 45.18 | 45.20 | 45.22 | 45.24 | 45.27 | 45.29 | 45.31 | 45.33 | 2, 010 |
| 2, 020 | 45.33      | 45.35 | 45.37 | 45.39 | 45.41 | 45.43 | 45.45 | 45.48 | 45.50 | 45.52 | 45.54 | 2, 020 |
| 2, 030 | 45.54      | 45.56 | 45.58 | 45.60 | 45.62 | 45.64 | 45.66 | 45.69 | 45.71 | 45.73 | 45.75 | 2, 030 |
| 2, 040 | 45.75      | 45.77 | 45.79 | 45.81 | 45.83 | 45.85 | 45.87 | 45.90 | 45.92 | 45.94 | 45.96 | 2, 040 |
| 2, 050 | 45.96      | 45.98 | 46.00 | 46.02 | 46.04 | 46.06 | 46.08 | 46.11 | 46.13 | 46.15 | 46.17 | 2, 050 |
| 2, 060 | 46.17      | 46.19 | 46.21 | 46.23 | 46.25 | 46.27 | 46.29 | 46.31 | 46.33 | 46.36 | 46.38 | 2, 060 |
| 2, 070 | 46.38      | 46.40 | 46.42 | 46.44 | 46.46 | 46.48 | 46.50 | 46.52 | 46.54 | 46.56 | 46.58 | 2, 070 |
| 2, 080 | 46.58      | 46.60 | 46.63 | 46.65 | 46.67 | 46.69 | 46.71 | 46.73 | 46.75 | 46.77 | 46.79 | 2, 080 |
| 2, 090 | 46.79      | 46.81 | 46.83 | 46.85 | 46.87 | 46.90 | 46.92 | 46.94 | 46.96 | 46.98 | 47.00 | 2, 090 |
| 2, 100 | 47.00      | 47.02 | 47.04 | 47.06 | 47.08 | 47.10 | 47.12 | 47.14 | 47.17 | 47.19 | 47.21 | 2, 100 |
| ° F    | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | ° F    |

\*Based on the International Temperature Scale of 1948.

# Table 17. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F    |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Millivolts |        |        |        |        |        |        |        |        |        |        |        |        |
| 2, 100     | 47. 00 | 47. 02 | 47. 04 | 47. 06 | 47. 08 | 47. 10 | 47. 12 | 47. 14 | 47. 17 | 47. 19 | 47. 21 | 2, 100 |
| 2, 110     | 47. 21 | 47. 23 | 47. 25 | 47. 27 | 47. 29 | 47. 31 | 47. 33 | 47. 35 | 47. 37 | 47. 39 | 47. 41 | 2, 110 |
| 2, 120     | 47. 41 | 47. 43 | 47. 45 | 47. 47 | 47. 49 | 47. 52 | 47. 54 | 47. 56 | 47. 58 | 47. 60 | 47. 62 | 2, 120 |
| 2, 130     | 47. 62 | 47. 64 | 47. 66 | 47. 68 | 47. 70 | 47. 72 | 47. 74 | 47. 76 | 47. 78 | 47. 80 | 47. 82 | 2, 130 |
| 2, 140     | 47. 82 | 47. 84 | 47. 86 | 47. 89 | 47. 91 | 47. 93 | 47. 95 | 47. 97 | 47. 99 | 48. 01 | 48. 03 | 2, 140 |
| 2, 150     | 48. 03 | 48. 05 | 48. 07 | 48. 09 | 48. 11 | 48. 13 | 48. 15 | 48. 17 | 48. 19 | 48. 21 | 48. 23 | 2, 150 |
| 2, 160     | 48. 23 | 48. 25 | 48. 27 | 48. 29 | 48. 32 | 48. 34 | 48. 36 | 48. 38 | 48. 40 | 48. 42 | 48. 44 | 2, 160 |
| 2, 170     | 48. 44 | 48. 46 | 48. 48 | 48. 50 | 48. 52 | 48. 54 | 48. 56 | 48. 58 | 48. 60 | 48. 62 | 48. 64 | 2, 170 |
| 2, 180     | 48. 64 | 48. 66 | 48. 68 | 48. 70 | 48. 72 | 48. 74 | 48. 76 | 48. 79 | 48. 81 | 48. 83 | 48. 85 | 2, 180 |
| 2, 190     | 48. 85 | 48. 87 | 48. 89 | 48. 91 | 48. 93 | 48. 95 | 48. 97 | 48. 99 | 49. 01 | 49. 03 | 49. 05 | 2, 190 |
| 2, 200     | 49. 05 | 49. 07 | 49. 09 | 49. 11 | 49. 13 | 49. 15 | 49. 17 | 49. 19 | 49. 21 | 49. 23 | 49. 25 | 2, 200 |
| 2, 210     | 49. 25 | 49. 27 | 49. 29 | 49. 31 | 49. 33 | 49. 35 | 49. 37 | 49. 39 | 49. 41 | 49. 43 | 49. 45 | 2, 210 |
| 2, 220     | 49. 45 | 49. 47 | 49. 49 | 49. 51 | 49. 53 | 49. 55 | 49. 57 | 49. 59 | 49. 61 | 49. 63 | 49. 65 | 2, 220 |
| 2, 230     | 49. 65 | 49. 67 | 49. 69 | 49. 71 | 49. 73 | 49. 76 | 49. 78 | 49. 80 | 49. 82 | 49. 84 | 49. 86 | 2, 230 |
| 2, 240     | 49. 86 | 49. 88 | 49. 90 | 49. 92 | 49. 94 | 49. 96 | 49. 98 | 50. 00 | 50. 02 | 50. 04 | 50. 06 | 2, 240 |
| 2, 250     | 50. 06 | 50. 08 | 50. 10 | 50. 12 | 50. 14 | 50. 16 | 50. 18 | 50. 20 | 50. 22 | 50. 24 | 50. 26 | 2, 250 |
| 2, 260     | 50. 26 | 50. 28 | 50. 30 | 50. 32 | 50. 34 | 50. 36 | 50. 38 | 50. 40 | 50. 42 | 50. 44 | 50. 46 | 2, 260 |
| 2, 270     | 50. 46 | 50. 48 | 50. 50 | 50. 52 | 50. 54 | 50. 56 | 50. 57 | 50. 59 | 50. 61 | 50. 63 | 50. 65 | 2, 270 |
| 2, 280     | 50. 65 | 50. 67 | 50. 69 | 50. 71 | 50. 73 | 50. 75 | 50. 77 | 50. 79 | 50. 81 | 50. 83 | 50. 85 | 2, 280 |
| 2, 290     | 50. 85 | 50. 87 | 50. 89 | 50. 91 | 50. 93 | 50. 95 | 50. 97 | 50. 99 | 51. 01 | 51. 03 | 51. 05 | 2, 290 |
| 2, 300     | 51. 05 | 51. 07 | 51. 09 | 51. 11 | 51. 13 | 51. 15 | 51. 17 | 51. 19 | 51. 21 | 51. 23 | 51. 25 | 2, 300 |
| 2, 310     | 51. 25 | 51. 27 | 51. 29 | 51. 31 | 51. 33 | 51. 35 | 51. 37 | 51. 39 | 51. 41 | 51. 43 | 51. 45 | 2, 310 |
| 2, 320     | 51. 45 | 51. 47 | 51. 48 | 51. 50 | 51. 52 | 51. 54 | 51. 56 | 51. 58 | 51. 60 | 51. 62 | 51. 64 | 2, 320 |
| 2, 330     | 51. 64 | 51. 66 | 51. 68 | 51. 70 | 51. 72 | 51. 74 | 51. 76 | 51. 78 | 51. 80 | 51. 82 | 51. 84 | 2, 330 |
| 2, 340     | 51. 84 | 51. 86 | 51. 88 | 51. 90 | 51. 92 | 51. 94 | 51. 96 | 51. 98 | 52. 00 | 52. 01 | 52. 03 | 2, 340 |
| 2, 350     | 52. 03 | 52. 05 | 52. 07 | 52. 09 | 52. 11 | 52. 13 | 52. 15 | 52. 17 | 52. 19 | 52. 21 | 52. 23 | 2, 350 |
| 2, 360     | 52. 23 | 52. 25 | 52. 27 | 52. 29 | 52. 31 | 52. 33 | 52. 35 | 52. 37 | 52. 39 | 52. 41 | 52. 42 | 2, 360 |
| 2, 370     | 52. 42 | 52. 44 | 52. 46 | 52. 48 | 52. 50 | 52. 52 | 52. 54 | 52. 56 | 52. 58 | 52. 60 | 52. 62 | 2, 370 |
| 2, 380     | 52. 62 | 52. 64 | 52. 66 | 52. 68 | 52. 70 | 52. 72 | 52. 74 | 52. 76 | 52. 77 | 52. 79 | 52. 81 | 2, 380 |
| 2, 390     | 52. 81 | 52. 83 | 52. 85 | 52. 87 | 52. 89 | 52. 91 | 52. 93 | 52. 95 | 52. 97 | 52. 99 | 53. 01 | 2, 390 |
| 2, 400     | 53. 01 | 53. 03 | 53. 05 | 53. 07 | 53. 08 | 53. 10 | 53. 12 | 53. 14 | 53. 16 | 53. 18 | 53. 20 | 2, 400 |
| 2, 410     | 53. 20 | 53. 22 | 53. 24 | 53. 26 | 53. 28 | 53. 30 | 53. 32 | 53. 34 | 53. 35 | 53. 37 | 53. 39 | 2, 410 |
| 2, 420     | 53. 39 | 53. 41 | 53. 43 | 53. 45 | 53. 47 | 53. 49 | 53. 51 | 53. 53 | 53. 55 | 53. 57 | 53. 59 | 2, 420 |
| 2, 430     | 53. 59 | 53. 60 | 53. 62 | 53. 64 | 53. 66 | 53. 68 | 53. 70 | 53. 72 | 53. 74 | 53. 76 | 53. 78 | 2, 430 |
| 2, 440     | 53. 78 | 53. 80 | 53. 82 | 53. 83 | 53. 85 | 53. 87 | 53. 89 | 53. 91 | 53. 93 | 53. 95 | 53. 97 | 2, 440 |
| 2, 450     | 53. 97 | 53. 99 | 54. 01 | 54. 03 | 54. 04 | 54. 06 | 54. 08 | 54. 10 | 54. 12 | 54. 14 | 54. 16 | 2, 450 |
| 2, 460     | 54. 16 | 54. 18 | 54. 20 | 54. 22 | 54. 24 | 54. 25 | 54. 27 | 54. 29 | 54. 31 | 54. 33 | 54. 35 | 2, 460 |
| 2, 470     | 54. 35 | 54. 37 | 54. 39 | 54. 41 | 54. 43 | 54. 44 | 54. 46 | 54. 48 | 54. 50 | 54. 52 | 54. 54 | 2, 470 |
| 2, 480     | 54. 54 | 54. 56 | 54. 58 | 54. 60 | 54. 62 | 54. 63 | 54. 65 | 54. 67 | 54. 69 | 54. 71 | 54. 73 | 2, 480 |
| 2, 490     | 54. 73 | 54. 75 | 54. 77 | 54. 79 | 54. 81 | 54. 82 | 54. 84 | 54. 86 | 54. 88 | 54. 90 | 54. 92 | 2, 490 |
| ° F        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F    |

\*Based on the International Temperature Scale of 1948.



# Table 18. Iron-Constantan Thermocouples (Modified 1913)

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .00   | .10   | .20   | .30   | .40   | .50   | .60   | .70   | .80   | .90   | 1.00  | Millivolts |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| Degrees F  |       |       |       |       |       |       |       |       |       |       |       |            |
| — 7.00     | —267  | —273  | —279  | —285  | —292  | —298  | —305  | —313  | —320  | ----- | ----- | — 7.00     |
| — 6.00     | —212  | —217  | —222  | —228  | —233  | —238  | —244  | —249  | —255  | —261  | —267  | — 6.00     |
| — 5.00     | —165  | —169  | —174  | —178  | —183  | —188  | —192  | —197  | —202  | —207  | —212  | — 5.00     |
| — 4.00     | —121  | —125  | —130  | —134  | —138  | —142  | —147  | —151  | —156  | —160  | —165  | — 4.00     |
| — 3.00     | —80   | —84   | —88   | —92   | —96   | —100  | —105  | —109  | —113  | —117  | —121  | — 3.00     |
| — 2.00     | —42   | —45   | —49   | —53   | —57   | —61   | —65   | —69   | —72   | —76   | —80   | — 2.00     |
| — 1.00     | —4    | —8    | —12   | —15   | —19   | —23   | —26   | —30   | —34   | —38   | —42   | — 1.00     |
| (—)0.00    | 32    | 29    | 25    | 21    | 18    | 14    | 10    | 7     | 3     | 0     | —4    | (—)0.00    |
| (+)0.00    | 32    | 36    | 39    | 43    | 46    | 50    | 53    | 57    | 60    | 64    | 67    | (+)0.00    |
| 1.00       | 67    | 71    | 74    | 78    | 81    | 85    | 88    | 92    | 95    | 99    | 102   | 1.00       |
| 2.00       | 102   | 105   | 109   | 112   | 116   | 119   | 123   | 126   | 129   | 133   | 136   | 2.00       |
| 3.00       | 136   | 140   | 143   | 146   | 150   | 153   | 156   | 160   | 163   | 166   | 170   | 3.00       |
| 4.00       | 170   | 173   | 177   | 180   | 183   | 187   | 190   | 193   | 196   | 200   | 203   | 4.00       |
| 5.00       | 203   | 206   | 210   | 213   | 216   | 220   | 223   | 226   | 230   | 233   | 236   | 5.00       |
| 6.00       | 236   | 240   | 243   | 246   | 249   | 253   | 256   | 259   | 263   | 266   | 269   | 6.00       |
| 7.00       | 269   | 272   | 276   | 279   | 282   | 286   | 289   | 292   | 295   | 299   | 302   | 7.00       |
| 8.00       | 302   | 305   | 308   | 312   | 315   | 318   | 321   | 325   | 328   | 331   | 334   | 8.00       |
| 9.00       | 334   | 338   | 341   | 344   | 347   | 351   | 354   | 357   | 360   | 364   | 367   | 9.00       |
| 10.00      | 367   | 370   | 373   | 376   | 380   | 383   | 386   | 389   | 393   | 396   | 399   | 10.00      |
| 11.00      | 399   | 402   | 406   | 409   | 412   | 415   | 419   | 422   | 425   | 428   | 431   | 11.00      |
| 12.00      | 431   | 435   | 438   | 441   | 444   | 448   | 451   | 454   | 457   | 461   | 464   | 12.00      |
| 13.00      | 464   | 467   | 470   | 474   | 477   | 480   | 483   | 487   | 490   | 493   | 496   | 13.00      |
| 14.00      | 496   | 499   | 503   | 506   | 509   | 513   | 516   | 519   | 522   | 526   | 529   | 14.00      |
| 15.00      | 529   | 532   | 535   | 539   | 542   | 545   | 548   | 552   | 555   | 558   | 561   | 15.00      |
| 16.00      | 561   | 565   | 568   | 571   | 574   | 578   | 581   | 584   | 587   | 591   | 594   | 16.00      |
| 17.00      | 594   | 597   | 601   | 604   | 607   | 610   | 614   | 617   | 620   | 623   | 627   | 17.00      |
| 18.00      | 627   | 630   | 633   | 636   | 640   | 643   | 646   | 649   | 653   | 656   | 659   | 18.00      |
| 19.00      | 659   | 662   | 666   | 669   | 672   | 675   | 679   | 682   | 685   | 688   | 692   | 19.00      |
| 20.00      | 692   | 695   | 698   | 701   | 705   | 708   | 711   | 714   | 718   | 721   | 724   | 20.00      |
| 21.00      | 724   | 727   | 731   | 734   | 737   | 741   | 744   | 747   | 750   | 754   | 757   | 21.00      |
| 22.00      | 757   | 760   | 763   | 767   | 770   | 773   | 777   | 780   | 783   | 786   | 790   | 22.00      |
| 23.00      | 790   | 793   | 796   | 799   | 803   | 806   | 809   | 812   | 816   | 819   | 822   | 23.00      |
| 24.00      | 822   | 825   | 829   | 832   | 835   | 839   | 842   | 845   | 848   | 852   | 855   | 24.00      |
| 25.00      | 855   | 858   | 861   | 865   | 868   | 871   | 874   | 878   | 881   | 884   | 887   | 25.00      |
| 26.00      | 887   | 890   | 894   | 897   | 900   | 903   | 907   | 910   | 913   | 916   | 919   | 26.00      |
| 27.00      | 919   | 923   | 926   | 929   | 932   | 936   | 939   | 942   | 945   | 948   | 952   | 27.00      |
| 28.00      | 952   | 955   | 958   | 961   | 964   | 967   | 971   | 974   | 977   | 980   | 983   | 28.00      |
| 29.00      | 983   | 987   | 990   | 993   | 996   | 999   | 1,002 | 1,006 | 1,009 | 1,012 | 1,015 | 29.00      |
| 30.00      | 1,015 | 1,018 | 1,021 | 1,024 | 1,028 | 1,031 | 1,034 | 1,037 | 1,040 | 1,043 | 1,046 | 30.00      |
| Millivolts | .00   | .10   | .20   | .30   | .40   | .50   | .60   | .70   | .80   | .90   | 1.00  | Millivolts |

\* Based on the International Temperature Scale of 1948.

# Table 18. Iron-Constantan Thermocouples (Modified 1913)—Continued

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | .00   | .10   | .20   | .30   | .40   | .50   | .60   | .70   | .80   | .90   | 1.00  | Millivolts |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| Degrees F  |       |       |       |       |       |       |       |       |       |       |       |            |
| 30.00      | 1,015 | 1,018 | 1,021 | 1,024 | 1,028 | 1,031 | 1,034 | 1,037 | 1,040 | 1,043 | 1,046 | 30.00      |
| 31.00      | 1,046 | 1,050 | 1,053 | 1,056 | 1,059 | 1,062 | 1,065 | 1,068 | 1,071 | 1,074 | 1,078 | 31.00      |
| 32.00      | 1,078 | 1,081 | 1,084 | 1,087 | 1,090 | 1,093 | 1,096 | 1,099 | 1,102 | 1,105 | 1,108 | 32.00      |
| 33.00      | 1,108 | 1,112 | 1,115 | 1,118 | 1,121 | 1,124 | 1,127 | 1,130 | 1,133 | 1,136 | 1,139 | 33.00      |
| 34.00      | 1,139 | 1,142 | 1,145 | 1,148 | 1,151 | 1,154 | 1,157 | 1,160 | 1,164 | 1,167 | 1,170 | 34.00      |
| 35.00      | 1,170 | 1,173 | 1,176 | 1,179 | 1,182 | 1,185 | 1,188 | 1,191 | 1,194 | 1,197 | 1,200 | 35.00      |
| 36.00      | 1,200 | 1,203 | 1,206 | 1,109 | 1,212 | 1,215 | 1,217 | 1,220 | 1,223 | 1,226 | 1,229 | 36.00      |
| 37.00      | 1,229 | 1,232 | 1,235 | 1,238 | 1,241 | 1,244 | 1,247 | 1,250 | 1,253 | 1,256 | 1,259 | 37.00      |
| 38.00      | 1,259 | 1,261 | 1,264 | 1,267 | 1,270 | 1,273 | 1,276 | 1,279 | 1,282 | 1,285 | 1,288 | 38.00      |
| 39.00      | 1,288 | 1,290 | 1,293 | 1,296 | 1,299 | 1,302 | 1,305 | 1,308 | 1,311 | 1,313 | 1,316 | 39.00      |
| 40.00      | 1,316 | 1,319 | 1,322 | 1,325 | 1,328 | 1,331 | 1,333 | 1,336 | 1,339 | 1,342 | 1,345 | 40.00      |
| 41.00      | 1,345 | 1,348 | 1,350 | 1,353 | 1,356 | 1,359 | 1,362 | 1,365 | 1,367 | 1,370 | 1,373 | 41.00      |
| 42.00      | 1,373 | 1,376 | 1,379 | 1,381 | 1,384 | 1,387 | 1,390 | 1,393 | 1,395 | 1,398 | 1,401 | 42.00      |
| Millivolts | .00   | .10   | .20   | .30   | .40   | .50   | .60   | .70   | .80   | .90   | 1.00  | Millivolts |

\* Based on the International Temperature Scale of 1948.



# Table 19. Iron-Constantan Thermocouples (Modified 1913)

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| °F   | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °F   |
|------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
|      | Millivolts |       |       |       |       |       |       |       |       |       |       |      |
| -310 | -7.66      | -7.68 | -7.69 | -7.70 | -7.71 | -7.73 | -7.74 | -7.75 | -7.76 | -7.78 | -7.79 | -310 |
| -300 | -7.52      | -7.54 | -7.55 | -7.57 | -7.58 | -7.59 | -7.61 | -7.62 | -7.64 | -7.65 | -7.66 | -300 |
| -290 | -7.38      | -7.39 | -7.40 | -7.42 | -7.44 | -7.45 | -7.46 | -7.48 | -7.49 | -7.51 | -7.52 | -290 |
| -280 | -7.22      | -7.24 | -7.25 | -7.27 | -7.28 | -7.30 | -7.31 | -7.33 | -7.34 | -7.36 | -7.38 | -280 |
| -270 | -7.06      | -7.07 | -7.09 | -7.11 | -7.12 | -7.14 | -7.15 | -7.17 | -7.19 | -7.20 | -7.22 | -270 |
| -260 | -6.89      | -6.90 | -6.92 | -6.94 | -6.96 | -6.97 | -6.99 | -7.01 | -7.02 | -7.04 | -7.06 | -260 |
| -250 | -6.71      | -6.73 | -6.75 | -6.77 | -6.78 | -6.80 | -6.82 | -6.84 | -6.85 | -6.87 | -6.89 | -250 |
| -240 | -6.53      | -6.55 | -6.57 | -6.59 | -6.61 | -6.62 | -6.64 | -6.66 | -6.68 | -6.70 | -6.71 | -240 |
| -230 | -6.35      | -6.37 | -6.38 | -6.40 | -6.42 | -6.44 | -6.46 | -6.48 | -6.50 | -6.52 | -6.53 | -230 |
| -220 | -6.16      | -6.18 | -6.19 | -6.21 | -6.23 | -6.25 | -6.27 | -6.29 | -6.31 | -6.33 | -6.35 | -220 |
| -210 | -5.96      | -5.98 | -6.00 | -6.02 | -6.04 | -6.06 | -6.08 | -6.10 | -6.12 | -6.14 | -6.16 | -210 |
| -200 | -5.76      | -5.78 | -5.80 | -5.82 | -5.84 | -5.86 | -5.88 | -5.90 | -5.92 | -5.94 | -5.96 | -200 |
| -190 | -5.55      | -5.57 | -5.59 | -5.61 | -5.63 | -5.65 | -5.67 | -5.70 | -5.72 | -5.74 | -5.76 | -190 |
| -180 | -5.34      | -5.36 | -5.38 | -5.40 | -5.42 | -5.44 | -5.46 | -5.49 | -5.51 | -5.53 | -5.55 | -180 |
| -170 | -5.12      | -5.14 | -5.16 | -5.19 | -5.21 | -5.23 | -5.25 | -5.27 | -5.30 | -5.32 | -5.34 | -170 |
| -160 | -4.90      | -4.92 | -4.94 | -4.97 | -4.99 | -5.01 | -5.03 | -5.06 | -5.08 | -5.10 | -5.12 | -160 |
| -150 | -4.68      | -4.70 | -4.72 | -4.74 | -4.76 | -4.79 | -4.81 | -4.83 | -4.86 | -4.88 | -4.90 | -150 |
| -140 | -4.44      | -4.47 | -4.49 | -4.51 | -4.54 | -4.56 | -4.58 | -4.61 | -4.63 | -4.65 | -4.68 | -140 |
| -130 | -4.21      | -4.23 | -4.26 | -4.28 | -4.30 | -4.33 | -4.35 | -4.38 | -4.40 | -4.42 | -4.44 | -130 |
| -120 | -3.97      | -4.00 | -4.02 | -4.04 | -4.07 | -4.09 | -4.12 | -4.14 | -4.16 | -4.19 | -4.21 | -120 |
| -110 | -3.73      | -3.76 | -3.78 | -3.81 | -3.83 | -3.85 | -3.88 | -3.90 | -3.93 | -3.95 | -3.97 | -110 |
| -100 | -3.49      | -3.51 | -3.54 | -3.56 | -3.59 | -3.61 | -3.64 | -3.66 | -3.68 | -3.71 | -3.73 | -100 |
| -90  | -3.24      | -3.27 | -3.29 | -3.32 | -3.34 | -3.36 | -3.39 | -3.41 | -3.44 | -3.46 | -3.49 | -90  |
| -80  | -2.99      | -3.02 | -3.04 | -3.07 | -3.09 | -3.12 | -3.14 | -3.17 | -3.19 | -3.22 | -3.24 | -80  |
| -70  | -2.74      | -2.76 | -2.79 | -2.81 | -2.84 | -2.86 | -2.89 | -2.92 | -2.94 | -2.97 | -2.99 | -70  |
| -60  | -2.48      | -2.51 | -2.53 | -2.56 | -2.58 | -2.61 | -2.64 | -2.66 | -2.69 | -2.71 | -2.74 | -60  |
| -50  | -2.22      | -2.25 | -2.27 | -2.30 | -2.33 | -2.35 | -2.38 | -2.40 | -2.43 | -2.46 | -2.48 | -50  |
| -40  | -1.96      | -1.99 | -2.01 | -2.04 | -2.06 | -2.09 | -2.12 | -2.14 | -2.17 | -2.20 | -2.22 | -40  |
| -30  | -1.70      | -1.72 | -1.75 | -1.78 | -1.80 | -1.83 | -1.86 | -1.88 | -1.91 | -1.94 | -1.96 | -30  |
| -20  | -1.43      | -1.46 | -1.48 | -1.51 | -1.54 | -1.56 | -1.59 | -1.62 | -1.64 | -1.67 | -1.70 | -20  |
| -10  | -1.16      | -1.19 | -1.21 | -1.24 | -1.27 | -1.29 | -1.32 | -1.35 | -1.38 | -1.40 | -1.43 | -10  |
| (-)0 | -0.89      | -0.91 | -0.94 | -0.97 | -1.00 | -1.02 | -1.05 | -1.08 | -1.10 | -1.13 | -1.16 | (-)0 |
| (+)0 | -0.89      | -0.86 | -0.83 | -0.80 | -0.78 | -0.75 | -0.72 | -0.70 | -0.67 | -0.64 | -0.61 | (+)0 |
| 10   | -0.61      | -0.58 | -0.56 | -0.53 | -0.50 | -0.48 | -0.45 | -0.42 | -0.39 | -0.36 | -0.34 | 10   |
| 20   | -0.34      | -0.31 | -0.28 | -0.25 | -0.22 | -0.20 | -0.17 | -0.14 | -0.11 | -0.09 | -0.06 | 20   |
| 30   | -0.06      | -0.03 | 0.00  | 0.03  | 0.05  | 0.08  | 0.11  | 0.14  | 0.17  | 0.19  | 0.22  | 30   |
| 40   | 0.22       | 0.25  | 0.28  | 0.31  | 0.34  | 0.36  | 0.39  | 0.42  | 0.45  | 0.48  | 0.50  | 40   |
| 50   | 0.50       | 0.53  | 0.56  | 0.59  | 0.62  | 0.65  | 0.67  | 0.70  | 0.73  | 0.76  | 0.79  | 50   |
| 60   | 0.79       | 0.82  | 0.84  | 0.87  | 0.90  | 0.93  | 0.96  | 0.99  | 1.02  | 1.04  | 1.07  | 60   |
| 70   | 1.07       | 1.10  | 1.13  | 1.16  | 1.19  | 1.22  | 1.25  | 1.28  | 1.30  | 1.33  | 1.36  | 70   |
| 80   | 1.36       | 1.39  | 1.42  | 1.45  | 1.48  | 1.51  | 1.54  | 1.56  | 1.59  | 1.62  | 1.65  | 80   |
| 90   | 1.65       | 1.68  | 1.71  | 1.74  | 1.77  | 1.80  | 1.83  | 1.85  | 1.88  | 1.91  | 1.94  | 90   |
| 100  | 1.94       | 1.97  | 2.00  | 2.03  | 2.06  | 2.09  | 2.12  | 2.14  | 2.17  | 2.20  | 2.23  | 100  |
| °F   | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °F   |

\*Based on the International Temperature Scale of 1948.

# Table 19. Iron-Constantan Thermocouples (Modified 1913)—Continued

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| °F         | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °F  |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| Millivolts |       |       |       |       |       |       |       |       |       |       |       |     |
| 100        | 1.94  | 1.97  | 2.00  | 2.03  | 2.06  | 2.09  | 2.12  | 2.14  | 2.17  | 2.20  | 2.23  | 100 |
| 110        | 2.23  | 2.26  | 2.29  | 2.32  | 2.35  | 2.38  | 2.41  | 2.44  | 2.47  | 2.50  | 2.52  | 110 |
| 120        | 2.52  | 2.55  | 2.58  | 2.61  | 2.64  | 2.67  | 2.70  | 2.73  | 2.76  | 2.79  | 2.82  | 120 |
| 130        | 2.82  | 2.85  | 2.88  | 2.91  | 2.94  | 2.97  | 3.00  | 3.03  | 3.06  | 3.08  | 3.11  | 130 |
| 140        | 3.11  | 3.14  | 3.17  | 3.20  | 3.23  | 3.26  | 3.29  | 3.32  | 3.35  | 3.38  | 3.41  | 140 |
| 150        | 3.41  | 3.44  | 3.47  | 3.50  | 3.53  | 3.56  | 3.59  | 3.62  | 3.65  | 3.68  | 3.71  | 150 |
| 160        | 3.71  | 3.74  | 3.77  | 3.80  | 3.83  | 3.86  | 3.89  | 3.92  | 3.95  | 3.98  | 4.01  | 160 |
| 170        | 4.01  | 4.04  | 4.07  | 4.10  | 4.13  | 4.16  | 4.19  | 4.22  | 4.25  | 4.28  | 4.31  | 170 |
| 180        | 4.31  | 4.34  | 4.37  | 4.40  | 4.43  | 4.46  | 4.49  | 4.52  | 4.55  | 4.58  | 4.61  | 180 |
| 190        | 4.61  | 4.64  | 4.67  | 4.70  | 4.73  | 4.76  | 4.79  | 4.82  | 4.85  | 4.88  | 4.91  | 190 |
| 200        | 4.91  | 4.94  | 4.97  | 5.00  | 5.03  | 5.06  | 5.09  | 5.12  | 5.15  | 5.18  | 5.21  | 200 |
| 210        | 5.21  | 5.24  | 5.27  | 5.30  | 5.33  | 5.36  | 5.39  | 5.42  | 5.45  | 5.48  | 5.51  | 210 |
| 220        | 5.51  | 5.54  | 5.57  | 5.60  | 5.63  | 5.66  | 5.69  | 5.72  | 5.75  | 5.78  | 5.81  | 220 |
| 230        | 5.81  | 5.84  | 5.87  | 5.90  | 5.93  | 5.96  | 5.99  | 6.02  | 6.05  | 6.08  | 6.11  | 230 |
| 240        | 6.11  | 6.14  | 6.17  | 6.20  | 6.24  | 6.27  | 6.30  | 6.33  | 6.36  | 6.39  | 6.42  | 240 |
| 250        | 6.42  | 6.45  | 6.48  | 6.51  | 6.54  | 6.57  | 6.60  | 6.63  | 6.66  | 6.69  | 6.72  | 250 |
| 260        | 6.72  | 6.75  | 6.78  | 6.81  | 6.84  | 6.87  | 6.90  | 6.93  | 6.96  | 7.00  | 7.03  | 260 |
| 270        | 7.03  | 7.06  | 7.09  | 7.12  | 7.15  | 7.18  | 7.21  | 7.24  | 7.27  | 7.30  | 7.33  | 270 |
| 280        | 7.33  | 7.36  | 7.39  | 7.42  | 7.45  | 7.48  | 7.51  | 7.54  | 7.58  | 7.61  | 7.64  | 280 |
| 290        | 7.64  | 7.67  | 7.70  | 7.73  | 7.76  | 7.79  | 7.82  | 7.85  | 7.88  | 7.91  | 7.94  | 290 |
| 300        | 7.94  | 7.97  | 8.00  | 8.04  | 8.07  | 8.10  | 8.13  | 8.16  | 8.19  | 8.22  | 8.25  | 300 |
| 310        | 8.25  | 8.28  | 8.31  | 8.34  | 8.37  | 8.40  | 8.44  | 8.47  | 8.50  | 8.53  | 8.56  | 310 |
| 320        | 8.56  | 8.59  | 8.62  | 8.65  | 8.68  | 8.71  | 8.74  | 8.77  | 8.80  | 8.84  | 8.87  | 320 |
| 330        | 8.87  | 8.90  | 8.93  | 8.96  | 8.99  | 9.02  | 9.05  | 9.08  | 9.11  | 9.14  | 9.17  | 330 |
| 340        | 9.17  | 9.20  | 9.24  | 9.27  | 9.30  | 9.33  | 9.36  | 9.39  | 9.42  | 9.45  | 9.48  | 340 |
| 350        | 9.48  | 9.51  | 9.54  | 9.58  | 9.61  | 9.64  | 9.67  | 9.70  | 9.73  | 9.76  | 9.79  | 350 |
| 360        | 9.79  | 9.82  | 9.85  | 9.88  | 9.92  | 9.95  | 9.98  | 10.01 | 10.04 | 10.07 | 10.10 | 360 |
| 370        | 10.10 | 10.13 | 10.16 | 10.19 | 10.22 | 10.25 | 10.28 | 10.32 | 10.35 | 10.38 | 10.41 | 370 |
| 380        | 10.41 | 10.44 | 10.47 | 10.50 | 10.53 | 10.56 | 10.60 | 10.63 | 10.66 | 10.69 | 10.72 | 380 |
| 390        | 10.72 | 10.75 | 10.78 | 10.81 | 10.84 | 10.87 | 10.90 | 10.94 | 10.97 | 11.00 | 11.03 | 390 |
| 400        | 11.03 | 11.06 | 11.09 | 11.12 | 11.15 | 11.18 | 11.21 | 11.24 | 11.28 | 11.31 | 11.34 | 400 |
| 410        | 11.34 | 11.37 | 11.40 | 11.43 | 11.46 | 11.49 | 11.52 | 11.55 | 11.58 | 11.62 | 11.65 | 410 |
| 420        | 11.65 | 11.68 | 11.71 | 11.74 | 11.77 | 11.80 | 11.83 | 11.86 | 11.89 | 11.92 | 11.96 | 420 |
| 430        | 11.96 | 11.99 | 12.02 | 12.05 | 12.08 | 12.11 | 12.14 | 12.17 | 12.20 | 12.23 | 12.26 | 430 |
| 440        | 12.26 | 12.30 | 12.33 | 12.36 | 12.39 | 12.42 | 12.45 | 12.48 | 12.51 | 12.54 | 12.57 | 440 |
| 450        | 12.57 | 12.60 | 12.64 | 12.67 | 12.70 | 12.73 | 12.76 | 12.79 | 12.82 | 12.85 | 12.88 | 450 |
| 460        | 12.88 | 12.91 | 12.94 | 12.98 | 13.01 | 13.04 | 13.07 | 13.10 | 13.13 | 13.16 | 13.19 | 460 |
| 470        | 13.19 | 13.22 | 13.25 | 13.28 | 13.31 | 13.34 | 13.38 | 13.41 | 13.44 | 13.47 | 13.50 | 470 |
| 480        | 13.50 | 13.53 | 13.56 | 13.59 | 13.62 | 13.65 | 13.68 | 13.72 | 13.75 | 13.78 | 13.81 | 480 |
| 490        | 13.81 | 13.84 | 13.87 | 13.90 | 13.93 | 13.96 | 13.99 | 14.02 | 14.05 | 14.08 | 14.12 | 490 |
| 500        | 14.12 | 14.15 | 14.18 | 14.21 | 14.24 | 14.27 | 14.30 | 14.33 | 14.36 | 14.39 | 14.42 | 500 |
| °F         | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °F  |

\*Based on the International Temperature Scale of 1948.



# Table 19. Iron-Constantan Thermocouples (Modified 1913)—Continued

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| °F  | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °F  |
|-----|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
|     | Millivolts |       |       |       |       |       |       |       |       |       |       |     |
| 500 | 14.12      | 14.15 | 14.18 | 14.21 | 14.24 | 14.27 | 14.30 | 14.33 | 14.36 | 14.39 | 14.42 | 500 |
| 510 | 14.42      | 14.45 | 14.48 | 14.52 | 14.55 | 14.58 | 14.61 | 14.64 | 14.67 | 14.70 | 14.73 | 510 |
| 520 | 14.73      | 14.76 | 14.79 | 14.82 | 14.85 | 14.88 | 14.91 | 14.94 | 14.98 | 15.01 | 15.04 | 520 |
| 530 | 15.04      | 15.07 | 15.10 | 15.13 | 15.16 | 15.19 | 15.22 | 15.25 | 15.28 | 15.31 | 15.34 | 530 |
| 540 | 15.34      | 15.37 | 15.40 | 15.44 | 15.47 | 15.50 | 15.53 | 15.56 | 15.59 | 15.62 | 15.65 | 540 |
| 550 | 15.65      | 15.68 | 15.71 | 15.74 | 15.77 | 15.80 | 15.84 | 15.87 | 15.90 | 15.93 | 15.96 | 550 |
| 560 | 15.96      | 15.99 | 16.02 | 16.05 | 16.08 | 16.11 | 16.14 | 16.17 | 16.20 | 16.23 | 16.26 | 560 |
| 570 | 16.26      | 16.30 | 16.33 | 16.36 | 16.39 | 16.42 | 16.45 | 16.48 | 16.51 | 16.54 | 16.57 | 570 |
| 580 | 16.57      | 16.60 | 16.63 | 16.66 | 16.69 | 16.72 | 16.75 | 16.78 | 16.82 | 16.85 | 16.88 | 580 |
| 590 | 16.88      | 16.91 | 16.94 | 16.97 | 17.00 | 17.03 | 17.06 | 17.09 | 17.12 | 17.15 | 17.18 | 590 |
| 600 | 17.18      | 17.21 | 17.24 | 17.28 | 17.31 | 17.34 | 17.37 | 17.40 | 17.43 | 17.46 | 17.49 | 600 |
| 610 | 17.49      | 17.52 | 17.55 | 17.58 | 17.61 | 17.64 | 17.68 | 17.71 | 17.74 | 17.77 | 17.80 | 610 |
| 620 | 17.80      | 17.83 | 17.86 | 17.89 | 17.92 | 17.95 | 17.98 | 18.01 | 18.04 | 18.08 | 18.11 | 620 |
| 630 | 18.11      | 18.14 | 18.17 | 18.20 | 18.23 | 18.26 | 18.29 | 18.32 | 18.35 | 18.38 | 18.41 | 630 |
| 640 | 18.41      | 18.44 | 18.47 | 18.50 | 18.54 | 18.57 | 18.60 | 18.63 | 18.66 | 18.69 | 18.72 | 640 |
| 650 | 18.72      | 18.75 | 18.78 | 18.81 | 18.84 | 18.87 | 18.90 | 18.94 | 18.97 | 19.00 | 19.03 | 650 |
| 660 | 19.03      | 19.06 | 19.09 | 19.12 | 19.15 | 19.18 | 19.21 | 19.24 | 19.27 | 19.30 | 19.34 | 660 |
| 670 | 19.34      | 19.37 | 19.40 | 19.43 | 19.46 | 19.49 | 19.52 | 19.55 | 19.58 | 19.61 | 19.64 | 670 |
| 680 | 19.64      | 19.67 | 19.70 | 19.74 | 19.77 | 19.80 | 19.83 | 19.86 | 19.89 | 19.92 | 19.95 | 680 |
| 690 | 19.95      | 19.98 | 20.01 | 20.04 | 20.07 | 20.10 | 20.13 | 20.16 | 20.20 | 20.23 | 20.26 | 690 |
| 700 | 20.26      | 20.29 | 20.32 | 20.35 | 20.38 | 20.41 | 20.44 | 20.47 | 20.50 | 20.53 | 20.56 | 700 |
| 710 | 20.56      | 20.59 | 20.62 | 20.66 | 20.69 | 20.72 | 20.75 | 20.78 | 20.81 | 20.84 | 20.87 | 710 |
| 720 | 20.87      | 20.90 | 20.93 | 20.96 | 20.99 | 21.02 | 21.05 | 21.08 | 21.11 | 21.14 | 21.18 | 720 |
| 730 | 21.18      | 21.21 | 21.24 | 21.27 | 21.30 | 21.33 | 21.36 | 21.39 | 21.42 | 21.45 | 21.48 | 730 |
| 740 | 21.48      | 21.51 | 21.54 | 21.57 | 21.60 | 21.64 | 21.67 | 21.70 | 21.73 | 21.76 | 21.79 | 740 |
| 750 | 21.79      | 21.82 | 21.85 | 21.88 | 21.91 | 21.94 | 21.97 | 22.00 | 22.03 | 22.06 | 22.10 | 750 |
| 760 | 22.10      | 22.13 | 22.16 | 22.19 | 22.22 | 22.25 | 22.28 | 22.31 | 22.34 | 22.37 | 22.40 | 760 |
| 770 | 22.40      | 22.43 | 22.46 | 22.49 | 22.52 | 22.55 | 22.58 | 22.62 | 22.65 | 22.68 | 22.71 | 770 |
| 780 | 22.71      | 22.74 | 22.77 | 22.80 | 22.83 | 22.86 | 22.89 | 22.92 | 22.95 | 22.98 | 23.01 | 780 |
| 790 | 23.01      | 23.04 | 23.08 | 23.11 | 23.14 | 23.17 | 23.20 | 23.23 | 23.26 | 23.29 | 23.32 | 790 |
| 800 | 23.32      | 23.35 | 23.38 | 23.41 | 23.44 | 23.47 | 23.50 | 23.53 | 23.56 | 23.60 | 23.63 | 800 |
| 810 | 23.63      | 23.66 | 23.69 | 23.72 | 23.75 | 23.78 | 23.81 | 23.84 | 23.87 | 23.90 | 23.93 | 810 |
| 820 | 23.93      | 23.96 | 23.99 | 24.02 | 24.06 | 24.09 | 24.12 | 24.15 | 24.18 | 24.21 | 24.24 | 820 |
| 830 | 24.24      | 24.27 | 24.30 | 24.33 | 24.36 | 24.39 | 24.42 | 24.45 | 24.48 | 24.52 | 24.55 | 830 |
| 840 | 24.55      | 24.58 | 24.61 | 24.64 | 24.67 | 24.70 | 24.73 | 24.76 | 24.79 | 24.82 | 24.85 | 840 |
| 850 | 24.85      | 24.88 | 24.91 | 24.94 | 24.98 | 25.01 | 25.04 | 25.07 | 25.10 | 25.13 | 25.16 | 850 |
| 860 | 25.16      | 25.19 | 25.22 | 25.25 | 25.28 | 25.32 | 25.35 | 25.38 | 25.41 | 25.44 | 25.47 | 860 |
| 870 | 25.47      | 25.50 | 25.53 | 25.56 | 25.59 | 25.62 | 25.65 | 25.68 | 25.72 | 25.75 | 25.78 | 870 |
| 880 | 25.78      | 25.81 | 25.84 | 25.87 | 25.90 | 25.93 | 25.96 | 25.99 | 26.02 | 26.06 | 26.09 | 880 |
| 890 | 26.09      | 26.12 | 26.15 | 26.18 | 26.21 | 26.24 | 26.27 | 26.30 | 26.33 | 26.36 | 26.40 | 890 |
| 900 | 26.40      | 26.43 | 26.46 | 26.49 | 26.52 | 26.55 | 26.58 | 26.61 | 26.64 | 26.67 | 26.70 | 900 |
| °F  | 0          | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °F  |

\*Based on the International Temperature Scale of 1948.

# Table 19. Iron-Constantan Thermocouples (Modified 1913)—Continued

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| °F         | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °F    |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Millivolts |       |       |       |       |       |       |       |       |       |       |       |       |
| 900        | 26.40 | 26.43 | 26.46 | 26.49 | 26.52 | 26.55 | 26.58 | 26.61 | 26.64 | 26.67 | 26.70 | 900   |
| 910        | 26.70 | 26.74 | 26.77 | 26.80 | 26.83 | 26.86 | 26.89 | 26.92 | 26.95 | 26.98 | 27.02 | 910   |
| 920        | 27.02 | 27.05 | 27.08 | 27.11 | 27.14 | 27.17 | 27.20 | 27.23 | 27.26 | 27.30 | 27.33 | 920   |
| 930        | 27.33 | 27.36 | 27.39 | 27.42 | 27.45 | 27.48 | 27.51 | 27.54 | 27.58 | 27.61 | 27.64 | 930   |
| 940        | 27.64 | 27.67 | 27.70 | 27.73 | 27.76 | 27.80 | 27.83 | 27.86 | 27.89 | 27.92 | 27.95 | 940   |
| 950        | 27.95 | 27.98 | 28.02 | 28.05 | 28.08 | 28.11 | 28.14 | 28.17 | 28.20 | 28.23 | 28.26 | 950   |
| 960        | 28.26 | 28.30 | 28.33 | 28.36 | 28.39 | 28.42 | 28.45 | 28.48 | 28.52 | 28.55 | 28.58 | 960   |
| 970        | 28.58 | 28.61 | 28.64 | 28.67 | 28.70 | 28.74 | 28.77 | 28.80 | 28.83 | 28.86 | 28.89 | 970   |
| 980        | 28.89 | 28.92 | 28.96 | 28.99 | 29.02 | 29.05 | 29.08 | 29.11 | 29.14 | 29.18 | 29.21 | 980   |
| 990        | 29.21 | 29.24 | 29.27 | 29.30 | 29.33 | 29.37 | 29.40 | 29.43 | 29.46 | 29.49 | 29.52 | 990   |
| 1,000      | 29.52 | 29.56 | 29.59 | 29.62 | 29.65 | 29.68 | 29.71 | 29.75 | 29.78 | 29.81 | 29.84 | 1,000 |
| 1,010      | 29.84 | 29.87 | 29.90 | 29.94 | 29.97 | 30.00 | 30.03 | 30.06 | 30.10 | 30.13 | 30.16 | 1,010 |
| 1,020      | 30.16 | 30.19 | 30.22 | 30.25 | 30.28 | 30.32 | 30.35 | 30.38 | 30.41 | 30.44 | 30.48 | 1,020 |
| 1,030      | 30.48 | 30.51 | 30.54 | 30.57 | 30.60 | 30.64 | 30.67 | 30.70 | 30.73 | 30.76 | 30.80 | 1,030 |
| 1,040      | 30.80 | 30.83 | 30.86 | 30.89 | 30.92 | 30.96 | 30.99 | 31.02 | 31.05 | 31.08 | 31.12 | 1,040 |
| 1,050      | 31.12 | 31.15 | 31.18 | 31.21 | 31.24 | 31.28 | 31.31 | 31.34 | 31.37 | 31.40 | 31.44 | 1,050 |
| 1,060      | 31.44 | 31.47 | 31.50 | 31.53 | 31.56 | 31.60 | 31.63 | 31.66 | 31.69 | 31.72 | 31.76 | 1,060 |
| 1,070      | 31.76 | 31.79 | 31.82 | 31.85 | 31.88 | 31.92 | 31.95 | 31.98 | 32.01 | 32.05 | 32.08 | 1,070 |
| 1,080      | 32.08 | 32.11 | 32.14 | 32.18 | 32.21 | 32.24 | 32.27 | 32.30 | 32.34 | 32.37 | 32.40 | 1,080 |
| 1,090      | 32.40 | 32.43 | 32.47 | 32.50 | 32.53 | 32.56 | 32.60 | 32.63 | 32.66 | 32.69 | 32.72 | 1,090 |
| 1,100      | 32.72 | 32.76 | 32.79 | 32.82 | 32.86 | 32.89 | 32.92 | 32.95 | 32.98 | 33.02 | 33.05 | 1,100 |
| 1,110      | 33.05 | 33.08 | 33.11 | 33.15 | 33.18 | 33.21 | 33.24 | 33.28 | 33.31 | 33.34 | 33.37 | 1,110 |
| 1,120      | 33.37 | 33.41 | 33.44 | 33.47 | 33.50 | 33.54 | 33.57 | 33.60 | 33.64 | 33.67 | 33.70 | 1,120 |
| 1,130      | 33.70 | 33.73 | 33.76 | 33.80 | 33.83 | 33.86 | 33.90 | 33.93 | 33.96 | 33.99 | 34.03 | 1,130 |
| 1,140      | 34.03 | 34.06 | 34.09 | 34.12 | 34.16 | 34.19 | 34.22 | 34.26 | 34.29 | 34.32 | 34.36 | 1,140 |
| 1,150      | 34.36 | 34.39 | 34.42 | 34.45 | 34.49 | 34.52 | 34.55 | 34.58 | 34.62 | 34.65 | 34.68 | 1,150 |
| 1,160      | 34.68 | 34.72 | 34.75 | 34.78 | 34.82 | 34.85 | 34.88 | 34.92 | 34.95 | 34.98 | 35.01 | 1,160 |
| 1,170      | 35.01 | 35.05 | 35.08 | 35.11 | 35.15 | 35.18 | 35.21 | 35.25 | 35.28 | 35.31 | 35.35 | 1,170 |
| 1,180      | 35.35 | 35.38 | 35.41 | 35.45 | 35.48 | 35.51 | 35.54 | 35.58 | 35.61 | 35.64 | 35.68 | 1,180 |
| 1,190      | 35.68 | 35.71 | 35.74 | 35.78 | 35.81 | 35.84 | 35.88 | 35.91 | 35.94 | 35.98 | 36.01 | 1,190 |
| 1,200      | 36.01 | 36.05 | 36.08 | 36.11 | 36.15 | 36.18 | 36.21 | 36.25 | 36.28 | 36.31 | 36.35 | 1,200 |
| 1,210      | 36.35 | 36.38 | 36.42 | 36.45 | 36.48 | 36.52 | 36.55 | 36.58 | 36.62 | 36.65 | 36.69 | 1,210 |
| 1,220      | 36.69 | 36.72 | 36.75 | 36.79 | 36.82 | 36.86 | 36.89 | 36.92 | 36.96 | 36.99 | 37.02 | 1,220 |
| 1,230      | 37.02 | 37.06 | 37.09 | 37.13 | 37.16 | 37.20 | 37.23 | 37.26 | 37.30 | 37.33 | 37.36 | 1,230 |
| 1,240      | 37.36 | 37.40 | 37.43 | 37.47 | 37.50 | 37.54 | 37.57 | 37.60 | 37.64 | 37.67 | 37.71 | 1,240 |
| 1,250      | 37.71 | 37.74 | 37.78 | 37.81 | 37.84 | 37.88 | 37.91 | 37.95 | 37.98 | 38.02 | 38.05 | 1,250 |
| 1,260      | 38.05 | 38.08 | 38.12 | 38.15 | 38.19 | 38.22 | 38.26 | 38.29 | 38.32 | 38.36 | 38.39 | 1,260 |
| 1,270      | 38.39 | 38.43 | 38.46 | 38.50 | 38.53 | 38.57 | 38.60 | 38.64 | 38.67 | 38.70 | 38.74 | 1,270 |
| 1,280      | 38.74 | 38.77 | 38.81 | 38.84 | 38.88 | 38.91 | 38.95 | 38.98 | 39.02 | 39.05 | 39.08 | 1,280 |
| 1,290      | 39.08 | 39.12 | 39.15 | 39.19 | 39.22 | 39.26 | 39.29 | 39.33 | 39.36 | 39.40 | 39.43 | 1,290 |
| 1,300      | 39.43 | 39.47 | 39.50 | 39.54 | 39.57 | 39.61 | 39.64 | 39.68 | 39.71 | 39.75 | 39.78 | 1,300 |
| °F         | 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | °F    |

\* Based on the International Temperature Scale of 1948.



# Table 19. Iron-Constantan Thermocouples (Modified 1913)—Continued

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| °F            | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °F            |
|---------------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------------|
|               | Millivolts |        |        |        |        |        |        |        |        |        |        |               |
| <b>1, 300</b> | 39. 43     | 39. 47 | 39. 50 | 39. 54 | 39. 57 | 39. 61 | 39. 64 | 39. 68 | 39. 71 | 39. 75 | 39. 78 | <b>1, 300</b> |
| <b>1, 310</b> | 39. 78     | 39. 82 | 39. 85 | 39. 89 | 39. 92 | 39. 96 | 39. 99 | 40. 03 | 40. 06 | 40. 10 | 40. 13 | <b>1, 310</b> |
| <b>1, 320</b> | 40. 13     | 40. 17 | 40. 20 | 40. 24 | 40. 27 | 40. 31 | 40. 34 | 40. 38 | 40. 41 | 40. 45 | 40. 48 | <b>1, 320</b> |
| <b>1, 330</b> | 40. 48     | 40. 52 | 40. 55 | 40. 59 | 40. 62 | 40. 66 | 40. 69 | 40. 73 | 40. 76 | 40. 80 | 40. 83 | <b>1, 330</b> |
| <b>1, 340</b> | 40. 83     | 40. 87 | 40. 90 | 40. 94 | 40. 98 | 41. 01 | 41. 05 | 41. 08 | 41. 12 | 41. 15 | 41. 19 | <b>1, 340</b> |
| <b>1, 350</b> | 41. 19     | 41. 22 | 41. 26 | 41. 29 | 41. 33 | 41. 36 | 41. 40 | 41. 43 | 41. 47 | 41. 50 | 41. 54 | <b>1, 350</b> |
| <b>1, 360</b> | 41. 54     | 41. 58 | 41. 61 | 41. 65 | 41. 68 | 41. 72 | 41. 75 | 41. 79 | 41. 82 | 41. 86 | 41. 90 | <b>1, 360</b> |
| <b>1, 370</b> | 41. 90     | 41. 93 | 41. 97 | 42. 00 | 42. 04 | 42. 07 | 42. 11 | 42. 14 | 42. 18 | 42. 22 | 42. 25 | <b>1, 370</b> |
| <b>1, 380</b> | 42. 25     | 42. 29 | 42. 32 | 42. 36 | 42. 39 | 42. 43 | 42. 46 | 42. 50 | 42. 53 | 42. 57 | 42. 61 | <b>1, 380</b> |
| <b>1, 390</b> | 42. 61     | 42. 64 | 42. 68 | 42. 71 | 42. 75 | 42. 78 | 42. 82 | 42. 85 | 42. 89 | 42. 92 | 42. 96 | <b>1, 390</b> |
| °F            | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | °F            |

\* Based on the International Temperature Scale of 1948.

# Table 20. Copper-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| Millivolts | 0.00      | 0.10   | 0.20   | 0.30   | 0.40   | 0.50   | 0.60   | 0.70   | 0.80   | 0.90   | 1.00   | Millivolts |
|------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|
|            | Degrees F |        |        |        |        |        |        |        |        |        |        |            |
| -5.00      | -272.4    | -281.8 | -291.5 | -301.7 | -312.3 | -322.7 | -333.8 | -344.6 | -355.1 | -365.3 | -375.2 | -5.00      |
| -4.00      | -192.0    | -199.2 | -206.6 | -214.1 | -221.8 | -229.7 | -237.8 | -246.0 | -254.5 | -263.3 | -272.4 | -4.00      |
| -3.00      | -126.2    | -132.4 | -138.6 | -144.9 | -151.3 | -157.8 | -164.4 | -171.1 | -178.0 | -184.9 | -192.0 | -3.00      |
| -2.00      | -68.6     | -74.1  | -79.6  | -85.2  | -90.9  | -96.6  | -102.4 | -108.2 | -114.2 | -120.2 | -126.2 | -2.00      |
| -1.00      | -16.4     | -21.4  | -26.5  | -31.6  | -36.7  | -41.9  | -47.2  | -52.4  | -57.8  | -63.2  | -68.6  | -1.00      |
| (-) 0.00   | 32.0      | 27.3   | 22.6   | 17.8   | 13.0   | 8.2    | 3.4    | -1.5   | -6.4   | -11.4  | -16.4  | (-) 0.00   |
| (+) 0.00   | 32.0      | 36.7   | 41.3   | 45.9   | 50.5   | 55.0   | 59.6   | 64.1   | 68.6   | 73.0   | 77.5   | (+) 0.00   |
| 1.00       | 77.5      | 81.9   | 86.2   | 90.6   | 95.0   | 99.3   | 103.6  | 107.8  | 112.1  | 116.3  | 120.5  | 1.00       |
| 2.00       | 120.5     | 124.7  | 128.9  | 133.1  | 137.3  | 141.4  | 145.4  | 149.5  | 153.6  | 157.7  | 161.7  | 2.00       |
| 3.00       | 161.7     | 165.7  | 169.7  | 173.7  | 177.7  | 181.7  | 185.6  | 189.5  | 193.5  | 197.4  | 201.3  | 3.00       |
| 4.00       | 201.3     | 205.2  | 209.0  | 212.9  | 216.7  | 220.5  | 224.4  | 228.2  | 232.0  | 235.7  | 239.5  | 4.00       |
| 5.00       | 239.5     | 243.2  | 247.0  | 250.7  | 254.4  | 258.1  | 261.9  | 265.6  | 269.2  | 272.9  | 276.6  | 5.00       |
| 6.00       | 276.6     | 280.2  | 283.9  | 287.5  | 291.1  | 294.7  | 298.3  | 301.9  | 305.5  | 309.1  | 312.6  | 6.00       |
| 7.00       | 312.6     | 316.2  | 319.7  | 323.3  | 326.8  | 330.3  | 333.8  | 337.3  | 340.8  | 344.3  | 347.8  | 7.00       |
| 8.00       | 347.8     | 351.3  | 354.8  | 358.2  | 361.7  | 365.1  | 368.6  | 372.0  | 375.4  | 378.8  | 382.2  | 8.00       |
| 9.00       | 382.2     | 385.6  | 389.0  | 392.4  | 395.8  | 399.2  | 402.5  | 405.9  | 409.2  | 412.6  | 415.9  | 9.00       |
| 10.00      | 415.9     | 419.2  | 422.6  | 425.9  | 429.2  | 432.5  | 435.9  | 439.2  | 442.4  | 445.7  | 449.0  | 10.00      |
| 11.00      | 449.0     | 452.3  | 455.5  | 458.8  | 462.1  | 465.3  | 468.6  | 471.9  | 475.1  | 478.3  | 481.5  | 11.00      |
| 12.00      | 481.5     | 484.7  | 488.0  | 491.2  | 494.4  | 497.6  | 500.8  | 504.0  | 507.2  | 510.4  | 513.5  | 12.00      |
| 13.00      | 513.5     | 516.7  | 519.9  | 523.1  | 526.2  | 529.4  | 532.5  | 535.7  | 538.8  | 542.0  | 545.1  | 13.00      |
| 14.00      | 545.1     | 548.2  | 551.3  | 554.5  | 557.6  | 560.7  | 563.8  | 566.9  | 570.0  | 573.1  | 576.2  | 14.00      |
| 15.00      | 576.2     | 579.3  | 582.4  | 585.5  | 588.6  | 591.6  | 594.7  | 597.8  | 600.8  | 603.9  | 606.9  | 15.00      |
| 16.00      | 606.9     | 610.0  | 613.0  | 616.1  | 619.1  | 622.2  | 625.2  | 628.2  | 631.3  | 634.3  | 637.3  | 16.00      |
| 17.00      | 637.3     | 640.3  | 643.3  | 646.4  | 649.4  | 652.4  | 655.4  | 658.4  | 661.4  | 664.4  | 667.4  | 17.00      |
| 18.00      | 667.4     | 670.3  | 673.3  | 676.3  | 679.3  | 682.2  | 685.2  | 688.2  | 691.1  | 694.1  | 697.1  | 18.00      |
| 19.00      | 697.1     | 700.0  | 703.0  | 705.9  | 708.9  | 711.8  | 714.8  | 717.7  | 720.6  | 723.6  | 726.5  | 19.00      |
| 20.00      | 726.5     | 729.4  | 732.3  | 735.3  | 738.2  | 741.1  | 744.0  | 746.9  | 749.9  | -----  | -----  | 20.00      |
| Millivolts | 0.00      | 0.10   | 0.20   | 0.30   | 0.40   | 0.50   | 0.60   | 0.70   | 0.80   | 0.90   | 1.00   | Millivolts |

\*Based on the International Temperature Scale of 1948.



# Table 21. Copper-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperature in Degrees F.\* Reference Junctions at 32° F.)

| ° F        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F  |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Millivolts |        |        |        |        |        |        |        |        |        |        |        |      |
| -310       | -5.379 | -5.388 | -5.397 | -5.406 | -----  | -----  | -----  | -----  | -----  | -----  | -----  | -310 |
| -300       | -5.284 | -5.294 | -5.303 | -5.313 | -5.322 | -5.332 | -5.341 | -5.351 | -5.360 | -5.370 | -5.379 | -300 |
| -290       | -5.185 | -5.195 | -5.205 | -5.215 | -5.225 | -5.235 | -5.245 | -5.254 | -5.264 | -5.274 | -5.284 | -290 |
| -280       | -5.081 | -5.092 | -5.102 | -5.113 | -5.124 | -5.134 | -5.144 | -5.154 | -5.165 | -5.175 | -5.185 | -280 |
| -270       | -4.974 | -4.985 | -4.996 | -5.007 | -5.018 | -5.029 | -5.039 | -5.050 | -5.060 | -5.071 | -5.081 | -270 |
| -260       | -4.863 | -4.874 | -4.885 | -4.897 | -4.908 | -4.919 | -4.930 | -4.941 | -4.952 | -4.963 | -4.974 | -260 |
| -250       | -4.747 | -4.759 | -4.770 | -4.782 | -4.794 | -4.805 | -4.817 | -4.829 | -4.840 | -4.851 | -4.863 | -250 |
| -240       | -4.627 | -4.640 | -4.652 | -4.664 | -4.676 | -4.688 | -4.700 | -4.712 | -4.724 | -4.735 | -4.747 | -240 |
| -230       | -4.504 | -4.517 | -4.529 | -4.542 | -4.554 | -4.566 | -4.579 | -4.591 | -4.603 | -4.615 | -4.627 | -230 |
| -220       | -4.377 | -4.390 | -4.403 | -4.415 | -4.428 | -4.441 | -4.454 | -4.466 | -4.479 | -4.492 | -4.504 | -220 |
| -210       | -4.246 | -4.259 | -4.272 | -4.286 | -4.299 | -4.312 | -4.325 | -4.338 | -4.351 | -4.364 | -4.377 | -210 |
| -200       | -4.111 | -4.125 | -4.138 | -4.151 | -4.165 | -4.179 | -4.192 | -4.206 | -4.219 | -4.232 | -4.246 | -200 |
| -190       | -3.972 | -3.986 | -4.000 | -4.014 | -4.028 | -4.042 | -4.056 | -4.069 | -4.083 | -4.097 | -4.111 | -190 |
| -180       | -3.829 | -3.844 | -3.858 | -3.873 | -3.887 | -3.901 | -3.915 | -3.929 | -3.944 | -3.958 | -3.972 | -180 |
| -170       | -3.684 | -3.698 | -3.713 | -3.727 | -3.742 | -3.757 | -3.771 | -3.786 | -3.800 | -3.815 | -3.829 | -170 |
| -160       | -3.533 | -3.548 | -3.564 | -3.579 | -3.594 | -3.609 | -3.624 | -3.639 | -3.654 | -3.669 | -3.684 | -160 |
| -150       | -3.380 | -3.396 | -3.411 | -3.426 | -3.441 | -3.457 | -3.472 | -3.488 | -3.503 | -3.518 | -3.533 | -150 |
| -140       | -3.223 | -3.238 | -3.254 | -3.270 | -3.286 | -3.301 | -3.317 | -3.333 | -3.349 | -3.365 | -3.380 | -140 |
| -130       | -3.062 | -3.078 | -3.094 | -3.110 | -3.127 | -3.143 | -3.159 | -3.175 | -3.191 | -3.207 | -3.223 | -130 |
| -120       | -2.897 | -2.914 | -2.931 | -2.947 | -2.964 | -2.980 | -2.997 | -3.013 | -3.030 | -3.046 | -3.062 | -120 |
| -110       | -2.730 | -2.747 | -2.764 | -2.781 | -2.797 | -2.814 | -2.831 | -2.847 | -2.864 | -2.881 | -2.897 | -110 |
| -100       | -2.559 | -2.577 | -2.594 | -2.611 | -2.628 | -2.645 | -2.662 | -2.679 | -2.696 | -2.713 | -2.730 | -100 |
| -90        | -2.385 | -2.402 | -2.420 | -2.437 | -2.455 | -2.472 | -2.490 | -2.507 | -2.525 | -2.542 | -2.559 | -90  |
| -80        | -2.207 | -2.225 | -2.243 | -2.260 | -2.278 | -2.296 | -2.314 | -2.332 | -2.349 | -2.367 | -2.385 | -80  |
| -70        | -2.026 | -2.044 | -2.063 | -2.081 | -2.099 | -2.117 | -2.135 | -2.153 | -2.171 | -2.189 | -2.207 | -70  |
| -60        | -1.842 | -1.860 | -1.879 | -1.897 | -1.916 | -1.934 | -1.953 | -1.971 | -1.989 | -2.008 | -2.026 | -60  |
| -50        | -1.654 | -1.673 | -1.692 | -1.711 | -1.729 | -1.748 | -1.767 | -1.786 | -1.804 | -1.823 | -1.842 | -50  |
| -40        | -1.463 | -1.482 | -1.502 | -1.521 | -1.540 | -1.559 | -1.578 | -1.597 | -1.616 | -1.635 | -1.654 | -40  |
| -30        | -1.270 | -1.289 | -1.308 | -1.328 | -1.347 | -1.367 | -1.386 | -1.406 | -1.425 | -1.444 | -1.463 | -30  |
| -20        | -1.072 | -1.092 | -1.112 | -1.132 | -1.152 | -1.171 | -1.191 | -1.210 | -1.230 | -1.250 | -1.270 | -20  |
| -10        | -0.872 | -0.893 | -0.913 | -0.933 | -0.953 | -0.973 | -0.993 | -1.013 | -1.033 | -1.053 | -1.072 | -10  |
| (-)0       | -0.670 | -0.690 | -0.710 | -0.730 | -0.751 | -0.771 | -0.792 | -0.812 | -0.832 | -0.852 | -0.872 | (-)0 |
| ° F        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F  |

\*Based on the International Temperature Scale of 1948.

# Table 21. Copper Constantan Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F  |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Millivolts |        |        |        |        |        |        |        |        |        |        |        |      |
| (+)0       | -0.670 | -0.649 | -0.629 | -0.608 | -0.588 | -0.567 | -0.546 | -0.526 | -0.505 | -0.484 | -0.463 | (+)0 |
| 10         | -0.463 | -0.442 | -0.421 | -0.401 | -0.380 | -0.359 | -0.339 | -0.318 | -0.297 | -0.275 | -0.254 | 10   |
| 20         | -0.254 | -0.233 | -0.212 | -0.191 | -0.170 | -0.149 | -0.128 | -0.107 | -0.085 | -0.064 | -0.042 | 20   |
| 30         | -0.042 | -0.021 | 0.000  | 0.021  | 0.042  | 0.064  | 0.086  | 0.107  | 0.129  | 0.150  | 0.171  | 30   |
| 40         | 0.171  | 0.193  | 0.215  | 0.236  | 0.258  | 0.280  | 0.302  | 0.324  | 0.346  | 0.367  | 0.389  | 40   |
| 50         | 0.389  | 0.411  | 0.433  | 0.455  | 0.477  | 0.499  | 0.521  | 0.543  | 0.565  | 0.587  | 0.609  | 50   |
| 60         | 0.609  | 0.631  | 0.654  | 0.676  | 0.698  | 0.720  | 0.743  | 0.765  | 0.787  | 0.809  | 0.832  | 60   |
| 70         | 0.832  | 0.854  | 0.877  | 0.899  | 0.922  | 0.944  | 0.967  | 0.990  | 1.012  | 1.035  | 1.057  | 70   |
| 80         | 1.057  | 1.080  | 1.103  | 1.126  | 1.148  | 1.171  | 1.194  | 1.217  | 1.240  | 1.263  | 1.286  | 80   |
| 90         | 1.286  | 1.309  | 1.332  | 1.355  | 1.378  | 1.401  | 1.424  | 1.448  | 1.471  | 1.494  | 1.517  | 90   |
| 100        | 1.517  | 1.540  | 1.563  | 1.587  | 1.610  | 1.633  | 1.657  | 1.680  | 1.704  | 1.727  | 1.751  | 100  |
| 110        | 1.751  | 1.774  | 1.798  | 1.821  | 1.845  | 1.869  | 1.893  | 1.916  | 1.940  | 1.963  | 1.987  | 110  |
| 120        | 1.987  | 2.011  | 2.035  | 2.059  | 2.083  | 2.107  | 2.131  | 2.154  | 2.178  | 2.202  | 2.226  | 120  |
| 130        | 2.226  | 2.250  | 2.274  | 2.298  | 2.322  | 2.346  | 2.370  | 2.394  | 2.418  | 2.443  | 2.467  | 130  |
| 140        | 2.467  | 2.491  | 2.516  | 2.540  | 2.565  | 2.589  | 2.614  | 2.638  | 2.663  | 2.687  | 2.711  | 140  |
| 150        | 2.711  | 2.736  | 2.760  | 2.785  | 2.810  | 2.835  | 2.859  | 2.884  | 2.908  | 2.933  | 2.958  | 150  |
| 160        | 2.958  | 2.982  | 3.007  | 3.032  | 3.057  | 3.082  | 3.107  | 3.132  | 3.157  | 3.182  | 3.207  | 160  |
| 170        | 3.207  | 3.232  | 3.257  | 3.282  | 3.307  | 3.332  | 3.357  | 3.382  | 3.407  | 3.433  | 3.458  | 170  |
| 180        | 3.458  | 3.483  | 3.508  | 3.534  | 3.559  | 3.584  | 3.610  | 3.635  | 3.661  | 3.686  | 3.712  | 180  |
| 190        | 3.712  | 3.737  | 3.762  | 3.787  | 3.813  | 3.839  | 3.864  | 3.890  | 3.915  | 3.941  | 3.967  | 190  |
| 200        | 3.967  | 3.993  | 4.018  | 4.044  | 4.070  | 4.096  | 4.122  | 4.148  | 4.174  | 4.199  | 4.225  | 200  |
| 210        | 4.225  | 4.251  | 4.277  | 4.303  | 4.329  | 4.355  | 4.381  | 4.408  | 4.434  | 4.460  | 4.486  | 210  |
| 220        | 4.486  | 4.512  | 4.538  | 4.564  | 4.590  | 4.617  | 4.643  | 4.670  | 4.696  | 4.722  | 4.749  | 220  |
| 230        | 4.749  | 4.775  | 4.801  | 4.827  | 4.854  | 4.880  | 4.907  | 4.934  | 4.960  | 4.987  | 5.014  | 230  |
| 240        | 5.014  | 5.040  | 5.067  | 5.094  | 5.120  | 5.147  | 5.174  | 5.200  | 5.227  | 5.254  | 5.280  | 240  |
| 250        | 5.280  | 5.307  | 5.334  | 5.361  | 5.388  | 5.415  | 5.442  | 5.469  | 5.496  | 5.523  | 5.550  | 250  |
| 260        | 5.550  | 5.577  | 5.604  | 5.631  | 5.658  | 5.685  | 5.712  | 5.739  | 5.766  | 5.794  | 5.821  | 260  |
| 270        | 5.821  | 5.848  | 5.875  | 5.903  | 5.930  | 5.957  | 5.985  | 6.012  | 6.040  | 6.067  | 6.094  | 270  |
| 280        | 6.094  | 6.122  | 6.149  | 6.177  | 6.204  | 6.232  | 6.259  | 6.287  | 6.314  | 6.342  | 6.370  | 280  |
| 290        | 6.370  | 6.397  | 6.425  | 6.453  | 6.481  | 6.508  | 6.536  | 6.564  | 6.592  | 6.620  | 6.647  | 290  |
| 300        | 6.647  | 6.675  | 6.703  | 6.731  | 6.759  | 6.786  | 6.814  | 6.842  | 6.870  | 6.898  | 6.926  | 300  |
| 310        | 6.926  | 6.954  | 6.982  | 7.010  | 7.038  | 7.066  | 7.095  | 7.123  | 7.151  | 7.180  | 7.208  | 310  |
| 320        | 7.208  | 7.236  | 7.264  | 7.292  | 7.321  | 7.349  | 7.377  | 7.405  | 7.434  | 7.462  | 7.491  | 320  |
| 330        | 7.491  | 7.519  | 7.548  | 7.576  | 7.605  | 7.633  | 7.661  | 7.690  | 7.719  | 7.747  | 7.776  | 330  |
| 340        | 7.776  | 7.805  | 7.834  | 7.862  | 7.891  | 7.920  | 7.949  | 7.978  | 8.006  | 8.035  | 8.064  | 340  |
| 350        | 8.064  | 8.092  | 8.120  | 8.149  | 8.178  | 8.207  | 8.236  | 8.265  | 8.294  | 8.323  | 8.352  | 350  |
| 360        | 8.352  | 8.381  | 8.410  | 8.439  | 8.468  | 8.497  | 8.526  | 8.555  | 8.584  | 8.613  | 8.642  | 360  |
| 370        | 8.642  | 8.672  | 8.701  | 8.730  | 8.759  | 8.788  | 8.818  | 8.847  | 8.876  | 8.905  | 8.935  | 370  |
| 380        | 8.935  | 8.964  | 8.994  | 9.023  | 9.052  | 9.082  | 9.111  | 9.141  | 9.170  | 9.200  | 9.229  | 380  |
| 390        | 9.229  | 9.259  | 9.288  | 9.317  | 9.347  | 9.376  | 9.406  | 9.436  | 9.466  | 9.495  | 9.525  | 390  |
| 400        | 9.525  | 9.555  | 9.584  | 9.614  | 9.644  | 9.674  | 9.703  | 9.733  | 9.763  | 9.793  | 9.823  | 400  |
| ° F        | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F  |

\*Based on the International Temperature Scale of 1948.



# Table 21. Copper-Constantan Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

| ° F | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F |
|-----|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----|
|     | Millivolts |        |        |        |        |        |        |        |        |        |        |     |
| 400 | 9.525      | 9.555  | 9.584  | 9.614  | 9.644  | 9.674  | 9.703  | 9.733  | 9.763  | 9.793  | 9.823  | 400 |
| 410 | 9.823      | 9.853  | 9.883  | 9.913  | 9.943  | 9.973  | 10.003 | 10.033 | 10.063 | 10.093 | 10.123 | 410 |
| 420 | 10.123     | 10.153 | 10.183 | 10.213 | 10.243 | 10.273 | 10.303 | 10.333 | 10.363 | 10.393 | 10.423 | 420 |
| 430 | 10.423     | 10.453 | 10.483 | 10.514 | 10.544 | 10.574 | 10.604 | 10.635 | 10.665 | 10.695 | 10.726 | 430 |
| 440 | 10.726     | 10.756 | 10.787 | 10.817 | 10.848 | 10.878 | 10.909 | 10.939 | 10.969 | 11.000 | 11.030 | 440 |
| 450 | 11.030     | 11.061 | 11.091 | 11.122 | 11.152 | 11.183 | 11.214 | 11.244 | 11.275 | 11.305 | 11.336 | 450 |
| 460 | 11.336     | 11.366 | 11.397 | 11.428 | 11.459 | 11.490 | 11.520 | 11.551 | 11.581 | 11.612 | 11.643 | 460 |
| 470 | 11.643     | 11.674 | 11.704 | 11.735 | 11.766 | 11.797 | 11.828 | 11.859 | 11.891 | 11.922 | 11.953 | 470 |
| 480 | 11.953     | 11.984 | 12.015 | 12.046 | 12.077 | 12.108 | 12.138 | 12.170 | 12.201 | 12.232 | 12.263 | 480 |
| 490 | 12.263     | 12.294 | 12.325 | 12.356 | 12.387 | 12.418 | 12.450 | 12.481 | 12.512 | 12.543 | 12.575 | 490 |
| 500 | 12.575     | 12.606 | 12.637 | 12.669 | 12.700 | 12.732 | 12.763 | 12.794 | 12.825 | 12.857 | 12.888 | 500 |
| 510 | 12.888     | 12.919 | 12.951 | 12.983 | 13.014 | 13.046 | 13.077 | 13.108 | 13.140 | 13.172 | 13.203 | 510 |
| 520 | 13.203     | 13.235 | 13.267 | 13.298 | 13.330 | 13.362 | 13.393 | 13.425 | 13.457 | 13.488 | 13.520 | 520 |
| 530 | 13.520     | 13.552 | 13.583 | 13.615 | 13.647 | 13.678 | 13.710 | 13.742 | 13.774 | 13.806 | 13.838 | 530 |
| 540 | 13.838     | 13.869 | 13.901 | 13.933 | 13.965 | 13.997 | 14.029 | 14.061 | 14.093 | 14.125 | 14.157 | 540 |
| 550 | 14.157     | 14.189 | 14.221 | 14.253 | 14.285 | 14.317 | 14.349 | 14.381 | 14.413 | 14.445 | 14.477 | 550 |
| 560 | 14.477     | 14.509 | 14.541 | 14.573 | 14.605 | 14.637 | 14.670 | 14.702 | 14.734 | 14.766 | 14.799 | 560 |
| 570 | 14.799     | 14.831 | 14.864 | 14.896 | 14.928 | 14.961 | 14.993 | 15.025 | 15.057 | 15.090 | 15.122 | 570 |
| 580 | 15.122     | 15.155 | 15.187 | 15.219 | 15.252 | 15.284 | 15.317 | 15.349 | 15.382 | 15.414 | 15.447 | 580 |
| 590 | 15.447     | 15.480 | 15.512 | 15.545 | 15.577 | 15.610 | 15.642 | 15.675 | 15.707 | 15.740 | 15.773 | 590 |
| 600 | 15.773     | 15.806 | 15.838 | 15.871 | 15.904 | 15.937 | 15.969 | 16.002 | 16.035 | 16.068 | 16.101 | 600 |
| 610 | 16.101     | 16.133 | 16.166 | 16.199 | 16.232 | 16.264 | 16.297 | 16.330 | 16.363 | 16.396 | 16.429 | 610 |
| 620 | 16.429     | 16.462 | 16.495 | 16.528 | 16.560 | 16.593 | 16.626 | 16.659 | 16.692 | 16.725 | 16.758 | 620 |
| 630 | 16.758     | 16.791 | 16.824 | 16.857 | 16.890 | 16.924 | 16.957 | 16.990 | 17.023 | 17.056 | 17.089 | 630 |
| 640 | 17.089     | 17.122 | 17.155 | 17.189 | 17.222 | 17.255 | 17.288 | 17.321 | 17.354 | 17.388 | 17.421 | 640 |
| 650 | 17.421     | 17.454 | 17.488 | 17.521 | 17.554 | 17.588 | 17.621 | 17.654 | 17.688 | 17.721 | 17.754 | 650 |
| 660 | 17.754     | 17.788 | 17.821 | 17.854 | 17.888 | 17.921 | 17.955 | 17.988 | 18.022 | 18.055 | 18.089 | 660 |
| 670 | 18.089     | 18.123 | 18.156 | 18.190 | 18.223 | 18.257 | 18.290 | 18.324 | 18.357 | 18.391 | 18.425 | 670 |
| 680 | 18.425     | 18.458 | 18.492 | 18.526 | 18.560 | 18.593 | 18.627 | 18.660 | 18.694 | 18.727 | 18.761 | 680 |
| 690 | 18.761     | 18.795 | 18.829 | 18.863 | 18.896 | 18.930 | 18.964 | 18.998 | 19.032 | 19.066 | 19.100 | 690 |
| 700 | 19.100     | 19.134 | 19.168 | 19.201 | 19.235 | 19.269 | 19.303 | 19.337 | 19.371 | 19.405 | 19.439 | 700 |
| 710 | 19.439     | 19.473 | 19.506 | 19.540 | 19.574 | 19.608 | 19.642 | 19.676 | 19.711 | 19.745 | 19.779 | 710 |
| 720 | 19.779     | 19.813 | 19.847 | 19.881 | 19.915 | 19.949 | 19.983 | 20.018 | 20.052 | 20.086 | 20.120 | 720 |
| 730 | 20.120     | 20.154 | 20.188 | 20.223 | 20.257 | 20.291 | 20.325 | 20.359 | 20.394 | 20.428 | 20.463 | 730 |
| 740 | 20.463     | 20.497 | 20.531 | 20.565 | 20.599 | 20.634 | 20.668 | 20.702 | 20.736 | 20.771 | 20.805 | 740 |
| 750 | 20.805     | 20.840 | 20.874 | -----  | -----  | -----  | -----  | -----  | -----  | -----  | -----  | 750 |
| ° F | 0          | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | ° F |

\*Based on the International Temperature Scale of 1948.

# Table 22. Chromel-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperature in Degrees F.\* Reference Junctions at 32° F.)

| ° F                          | 0          | 10    | 20    | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100   | ° F                          |
|------------------------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------------------------|
| -300<br>-200<br>-100<br>(-)0 | Millivolts |       |       |       |       |       |       |       |       |       |       | -300<br>-200<br>-100<br>(-)0 |
|                              | -8.30      | -8.45 | -8.60 | -7.04 | -7.24 | -7.44 | -7.62 | -7.80 | -7.97 | -8.14 | -8.30 |                              |
|                              | -6.40      | -6.62 | -6.83 | -4.73 | -4.98 | -5.23 | -5.48 | -5.72 | -5.95 | -6.18 | -6.40 |                              |
|                              | -3.94      | -4.21 | -4.47 | -1.94 | -2.24 | -2.54 | -2.83 | -3.11 | -3.39 | -3.67 | -3.94 |                              |
| (+)0                         | -1.02      | -0.71 | -0.39 | -0.07 | 0.26  | 0.59  | 0.92  | 1.26  | 1.59  | 1.93  | 2.27  | (+)0                         |
| 100                          | 2.27       | 2.62  | 2.97  | 3.32  | 3.68  | 4.04  | 4.40  | 4.77  | 5.13  | 5.50  | 5.87  | 100                          |
| 200                          | 5.87       | 6.25  | 6.62  | 7.00  | 7.38  | 7.76  | 8.15  | 8.54  | 8.93  | 9.32  | 9.71  | 200                          |
| 300                          | 9.71       | 10.11 | 10.51 | 10.91 | 11.31 | 11.71 | 12.11 | 12.52 | 12.93 | 13.34 | 13.75 | 300                          |
| 400                          | 13.75      | 14.17 | 14.59 | 15.00 | 15.42 | 15.84 | 16.26 | 16.68 | 17.10 | 17.52 | 17.95 | 400                          |
| 500                          | 17.95      | 18.38 | 18.81 | 19.23 | 19.66 | 20.09 | 20.52 | 20.95 | 21.39 | 21.82 | 22.25 | 500                          |
| 600                          | 22.25      | 22.69 | 23.13 | 23.57 | 24.00 | 24.44 | 24.88 | 25.32 | 25.76 | 26.20 | 26.65 | 600                          |
| 700                          | 26.65      | 27.09 | 27.53 | 27.97 | 28.42 | 28.86 | 29.31 | 29.75 | 30.19 | 30.64 | 31.09 | 700                          |
| 800                          | 31.09      | 31.54 | 31.98 | 32.43 | 32.87 | 33.32 | 33.77 | 34.22 | 34.67 | 35.12 | 35.57 | 800                          |
| 900                          | 35.57      | 36.02 | 36.47 | 36.92 | 37.37 | 37.82 | 38.26 | 38.71 | 39.16 | 39.61 | 40.06 | 900                          |
| 1,000                        | 40.06      | 40.51 | 40.96 | 41.41 | 41.86 | 42.31 | 42.76 | 43.21 | 43.66 | 44.11 | 44.56 | 1,000                        |
| 1,100                        | 44.56      | 45.01 | 45.46 | 45.91 | 46.36 | 46.81 | 47.26 | 47.71 | 48.15 | 48.60 | 49.04 | 1,100                        |
| 1,200                        | 49.04      | 49.49 | 49.93 | 50.37 | 50.82 | 51.27 | 51.72 | 52.16 | 52.61 | 53.05 | 53.50 | 1,200                        |
| 1,300                        | 53.50      | 53.94 | 54.38 | 54.83 | 55.27 | 55.71 | 56.15 | 56.59 | 57.03 | 57.48 | 57.92 | 1,300                        |
| 1,400                        | 57.92      | 58.36 | 58.80 | 59.24 | 59.68 | 60.11 | 60.55 | 60.99 | 61.43 | 61.86 | 62.30 | 1,400                        |
| 1,500                        | 62.30      | 62.74 | 63.17 | 63.60 | 64.04 | 64.47 | 64.90 | 65.34 | 65.77 | 66.20 | 66.63 | 1,500                        |
| 1,600                        | 66.63      | 67.05 | 67.48 | 67.91 | 68.34 | 68.76 | 69.19 | 69.62 | 70.05 | 70.47 | 70.90 | 1,600                        |
| 1,700                        | 70.90      | 71.32 | 71.75 | 72.17 | 72.60 | 73.02 | 73.44 | 73.86 | 74.28 | 74.70 | 75.12 | 1,700                        |
| 1,800                        | 75.12      | 75.53 | 75.95 | 76.37 | ----- | ----- | ----- | ----- | ----- | ----- | ----- | 1,800                        |
| ° F                          | 0          | 10    | 20    | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100   | ° F                          |

\*Based on the International Temperature Scale of 1948.

WASHINGTON, November 15, 1954.





